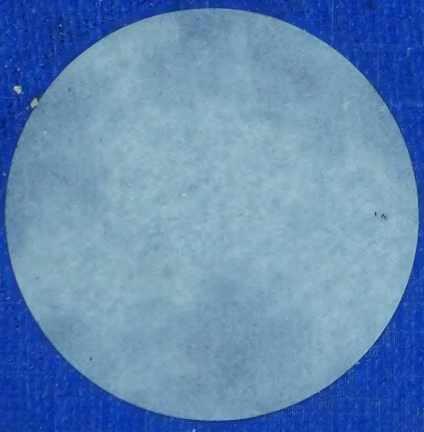

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FLORA

OF

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FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. VII.

CYPERACEÆ, GRAMINEÆ AND GENERAL INDEX.

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PREFACE TO VOL. VII.

The length of time, upwards of a quarter of a century, occupied in the publication of the Flora of British India, has resulted in the later volumes containing a far more complete account of the families of plants to which they are devoted than do the earlier volumes of theirs.

For this there are two reasons, the extension of the area of British India in the interval, and the many collections that have been transmitted to Kew from wholly or imperfectly explored regions of India during the same interval.

The extension of area has been : on the East, Munnepore, and by far the greater part of Burma, adding many Indo-Chinese genera and species to the flora ; on the West, British Beluchistan and other trans-Indus hills and valleys, adding Oriental genera and species. Neither of these extensions have, however, added so much to the Indian flora as might have been expected ; for, as regards Burma, extensive materials were already available from Pegu, Martaban, Tenasserim, and the upper and lower Irawaddy valleys ; and as regards the West, the low country Oriental flora is represented in the plains of Sind and the Panjab, and the upland and alpine in the trans-Indus valleys, Western Tibet, and the Kashmir Himalaya.

On the other hand, the collections received from previously unexplored and partially explored regions of India proper have been numerous and full of novelty and interest. Of these the first in importance are Mr. C. B. Clarke's, whether for their extent, the knowledge and judgment with which the specimens were selected, ticketed, and preserved, or for the valuable observations which accompany them. They were obtained over a greater extent of India than had been traversed by any other Indian botanist, and at all elevations, up to 18,500 ft., from the bend of the Indus at Gilgit, Kashmir, and Western

Tibet, in the extreme West; from Sikkim, Bengal, Assam, and Munnepore in the East; from Behar, Central India, and Chota Nagpur in the centre; and from the Nilghiri Hills in the South. Next in importance are the Malay Peninsula collections made by Father Scortechini, the Messrs. Curtis, Wray, Hervey, Hullett, Merton, and Ridley, and by collectors sent by Dr. King from the Botanic Gardens of Calcutta. These latter have added several hundred species to the genera described in the first volume alone of this Flora, and have been published by Dr. King in the Journal of the Asiatic Society of Bengal. Thirdly rank Mr. Duthie's copious and excellently preserved collections made in Kashmir, Western Tibet, Garwhal, Kumaon, Rohilkund, Rajmahal, and Central India, and Dr. Aitchison's from the Kurrum and other valleys west of the Indus.

Of the works upon Indian Botany that have appeared during the publication of Flora of the British India, the more important are Mr. C. B. Clarke's "Compositæ Indicæ" (1876); Mr. Kurz's "Forest Flora of Burma" (1876); Dr. Brandis' "Forest Flora of N.-W. and Central India" (1874); Col. Beddome's "Flora Sylvatica of Southern India," vols. i. and ii. (1869-73), and his "Icones Plantarum Indiæ Orientalis," vol. i. (1874); Dr. Trimen's "Handbook of the Ceylon Flora," Parts i.—iii. (1893-5); and Dr. King's "Annals of the Botanic Gardens, Calcutta," vols. i.—vii. (1888-1897), which include illustrated monographs by himself and other Indian botanists of the Indian species of *Ficus*, *Quercus*, *Pedicularis*, *Magnoliaceæ*, *Anonaceæ*, *Bambusæ*, &c.

In the Preface to the first volume of this work I have stated that it was proposed to include in it the Ferns and their allies. This intention has been abandoned, owing to the appearance of excellent available works describing the Indian species, especially Hooker and Baker's "Synopsis Filicum" (1874); Col. Beddome's "Review of the Ferns of N.-W. India" (1880), and his "Handbook of the Ferns of British India" (1883), with Supplement (1892).

Having regard to this "Flora of British India," I must remind those who may use it that it has no pretensions to give full characters of the genera and species contained in it. It aims at no more than being an attempt to sweep together and systematize within a reasonable time and compass, a century of hitherto undigested materials scattered through a library of botanical books and monographs, and preserved in vast collections, many of which latter had lain unexamined for half a

century in the cellars of the India House and in public and private herbaria. It is a pioneer work, which, besides enabling botanists to name with some accuracy a host of Indian plants, may, I hope, serve two higher purposes, to facilitate the compilation of local Indian floras and monographs of the large Indian genera; and to enable the phytographer to discuss the problems of the distribution of plants from the point of view of what is perhaps the richest, and is certainly the most varied botanical area on the surface of the globe, and one which, in a greater degree than any other, contains representatives of the floras of both the Eastern and Western Hemispheres.

J. D. Hooker.

November, 1897.

ADDENDUM.

Vol. vii. p. 416, under 2. *S. chilianthum*, insert habitats:

Singapore, *Wallich*; Malacca, *Stevens*. DISTRIB.: Java, Sumatra.

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FLORA OF BRITISH INDIA.

Order CLXXIII. GRAMINEÆ.

Erect decumbent or creeping herbs, or in Tribe *Bambuseæ* shrubs or trees. *Stem* terete or compressed, jointed; internodes solid or hollow. *Leaves* simple, usually long and narrow, entire, parallel-nerved, with a sheathing base distinct from the blade; sheath split to the base (very rarely entire) with often a transverse hyaline erect appendage (*ligula*) at the union with the blade, facing the latter. *Inflorescence* terminal, rarely also from the upper sheaths, consisting of spicate racemed capitate or panicled spikelets. *Spikelets* of three or more alternate distichous bracts (*glumes*), of which the two lowest are normally empty, and the succeeding, if more than one, are arranged on an axis (*rachilla*), and are all or some of them flowering; within each flowering glume and opposite to it is an erect narrow 2-nerved scale (*palea*), the margins of which are infolded towards the glume and enclose at the base the true flower. *Flowers* uni- or bisexual, consisting of 2, rarely 3 or 6 microscopic scales (*lodicules*) representing a perianth, and stamens or a pistil, or both. *Stamens* 3, rarely 1, 2, 6, or very rarely many, hypogynous; filaments capillary; anthers versatile, fugacious, of two parallel cells, with no apparent connective; pollen globose. *Ovary* entire, 1-celled; styles 2, rarely 3, free or united at the base, usually elongate, and exserted from the sides or top of the spikelets, clothed with simple or branched stigmatic hairs; ovule erect, anatropous. *Fruit* a seed-like utricle (*grain*) free within the flg. glume and palea, or adherent to either or both; pericarp very thin, rarely thick or separable from the seed. *Seed* erect; albumen copious, mealy; embryo minute, at the base of and outside the albumen; cotyledon scutelliform, bearing on its face an erect conical plumule, and descending conical radicle.

Genera about 300; species estimated at about 3000, but many are doubtful, and more mere varieties; natives of all climates and regions.

In working up the grasses for this Flora, I find the multiplication of species to have passed all bounds, and their nomenclature to be involved in a corresponding degree. This has arisen from two principal causes, from authors not taking into account the wide area over which the individual species of grasses range,* and from the imperfection of the descriptions of the earlier and many later authors. It is sixty-two years since Kunth published his "Agrostographia Synoptica (Tubingen, 1833), which is an uncritical sweeping up of all previously known supposed genera and species, with imperfect descriptions and synonyms. It was succeeded (in 1835) by a second volume, in which a few hundred species of the first volume are very fully and accurately described, and valuable notes upon others are added. In 1855 Steudel's "Synopsis Graminum" appeared. It in no respect advances, and in many ways retards the student of the Order. Of more recent works on *Gramineæ*, three only are of great mark, namely, Munro's very able Monograph of the *Bambuseæ* (Trans. Linn. Soc. vol. xxvi. (1868); Bentham's revision of the genera, Gen. Plant. vol. iii.

* It is a fact familiar to every one who examines collections of plants from hitherto unexplored countries, that novelties amongst the grasses are very few indeed, compared with what occurs in other natural families.

(1883), a work of remarkable completeness and accuracy, considering the chaotic condition in which the author found the Order; and Hackel's admirable monograph of the *Andropogoneæ* in A. de Candolle "Monogr. Phanerog." vol. vi. (1889), the largest and most difficult Tribe of grasses.

I have cited synonyms to a much greater extent in this than in any other Order described in the "Flora of British India" (except the "Cyperaceæ" by Clarke) with the view of aiding the researches of future authors. Many of these synonyms had never been fixed with any approach to exactness, and many were for the first time identified during Mr. Jackson's and my labours on the "Index Kewensis." I cannot expect that all will prove to have been satisfactorily reduced, and still less that all have been brought to light.

Referring to the classification of the Indian genera, I have been compelled to diverge somewhat from Bentham's arrangement, and to abandon some of his Tribes and Subtribes, in many cases following Hackel's more recent and well-considered views. These divisions throughout the Order are of very unequal value, and are as difficult of delimitation as of definition upon any fixed principles. They are, indeed, in some cases arbitrary, and in others more or less artificial. In this matter, and in the description or revision of some of the very difficult genera, I have derived great aid from Dr. Stapf, Assistant in the Herbarium of the Royal Gardens, who has lately been instructed by the Director of Kew to study and name the materials in that Herbarium critically. As Dr. Stapf shares my views as to the wide ranges of the species, and the undue multiplication of their synonyms, his labours may be expected to yield far-reaching results, taxonomic, morphological and geographical, and to modify some of the conclusions arrived at in the following attempt to methodize the Indian *Gramineæ*. As affecting the numbers and synonyms taken from "Wallich's List," I have to observe that for some of them I have had to depend on the ticketed duplicates in Herb. Hook. and Benth., the types being wanting in the Wallichian collection in the rooms of the Linnæan Society.

Series A. **Panicaceæ.** Spikelets articulate on their pedicels, or deciduous with them, 1–2-fld., upper fl. alone (if 2) fruiting.

Exceptions. Spikelets inarticulate on their pedicels in *Arundinella* and *Isachne*. Spikelets articulate on their pedicels, or with articulate pedicels occur in *Poaceæ*, in *Alopecurus*, *Cyathopus*, *Polypogon*, *Fingerhuthia*, and *Lophatherum*. Upper flower alone fertile in Tribe *Phalarideæ* of *Poaceæ*, and in *Tristachya*.

I. Rachis of infl. inarticulate, or subarticulate in *Stenotaphrum*. Fl. gl. usually coriaceous or herbaceous.

Tribe I. PANICEÆ. *Spikelets* 2-fld., upper fl. bisexual, lower male or neuter, rarely both fertile. (*Spinifex* is diœcious.)

* Spikelets articulate on their pedicels, except *Isachne* and *Arundinella*.

† Spikelets not involucellate by bristles.

§ *Spikelets not awned* (*gl. II and III beaked or awned in Pan. Crus-galli*). (*See also Tricholæna* and *Arundinella*.)

Spikelets dorsally flattened, base not thickened; gls. 3, with very rarely a minute fourth (lowest) . . .	1. PASPALUM.
Spikelets of *Paspalum*, but with a thickened basal callus .	2. ERIOCHLOA.
Spikelets subglobose, panicled; gls. 4, I and II separately deciduous, subequal	3. ISACHNE.
Spikelets panicled or spicate, gls. 4 (2 in *P. subeglume*) I and II very rarely subequal, II and III awned in *P. Crus-galli*, IV rarely very shortly awned . .	4. PANICUM.
Spikelets of *Panicum*, but gl. IV. narrowed into a short, flattened stipes, or with 2 appendages near the base .	5. ICHNANTHUS.
Spikelets innumerable, very minute, hairy, densely crowded in the capillary branches of a very large panicle	6. THYSANOLÆNA.

Spikelets panicled, branches of panicle produced beyond the uppermost spikelets; gl. I minute, hyaline . . 7. CHAMÆRAPHIS.
Dicœcious, male spikelets in clustered spikes, fem. solitary . . . . . 8. SPINIFEX.

§§ *Spikelets awned, except in some sp. of Tricholæna and Arundinella.*

Spikelets of *Panicum*, but nerves of gl. II broadly fimbriate, and palea of III deeply cleft, IV awned 9. AXONOPUS.
Spikelets silky; gl. I 0, or minute and distant from II and III with usually capillary awns . . . . 10. TRICHOLÆNA.
Spikelets solitary or fascicled on a simple rachis or the branches of a panicle; gl. I long awned . . . 11. OPLISMENUS.
Spikelets persistent on the pedicels, or gls. I and II separately deciduous, IV deciduous; usually awned, awn bent . . . . . 12. ARUNDINELLA.

†† Spikelets each surrounded by an involucel of bristles . 13. SETARIA.

** Spikelets persistent on their pedicels, at least the fertile, or deciduous with their pedicels.

† *Spikelets in involucelled deciduous fascicles.*

Involucel of bristles . . . . . 14. PENNISETUM.
Involucel of spines connate at the base . . . . 15. CENCHRUS.

†† *Spikelets not involucelled.*

Spikelets 2-seriate on a flat subarticulate rachis . . 16. STENOTAPHRUM.
Spikelets (at least the fertile) 1-seriate on an inarticulate flat rachis, the base of which dilates and encloses a fruiting spikelet . . . . . 17. THUAREA.

Tribe II. ORYZEÆ. *Spikelets* 1-fld., articulate on their pedicels and deciduous from them. *Palea* 1–3-nerved. *Stamens* 6 or fewer.

Spikelets 2-sexual, awned or not; gls. 4, I and II minute or setaceous . . . . . 18. ORYZA.
Spikelets 2-sexual, awnless; gls. 2, broad, thin . . 19. LEERSIA.
Spikelets 2-sexual, awned; gls. 2, narrow, thin . . 20. HYGRORHIZA.
Spikelets 1-sexual; fruiting gl. inflated; leaves broad . 21. LEPTASPIS.

Tribe III. ZOYSIEÆ. *Spikelets* 1-fld., deciduous with their pedicels, 2-sexual, or some imperfect.

* *Spikelets fascicled.*

Spikes geminate; fascicles unilateral . . . . 22. TRACHYS.
Spikes solitary; fascicles quaquaversal; gl. III echinate . 23. TRAGUS.

** *Spikelets solitary, rarely 2-nate.*

Racemes slender; pedicels flattened; gl. I and II muricate . . . . . 24. LATIPES.
Raceme slender; spikelets minute, base of gl. I saccate . 25. LOPHOLEPIS.
Spike very slender; spikelets narrow; gl. I and II awned . . . . . 26. PEROTIS.
Spike rigid; spikelets appressed to the rachis, not awned . 27. ZOYSIA.

II. Rachis of inflorescence usually articulate.

Tribe IV. ANDROPOGONEÆ. *Spikelets* usually 2-nate, or the terminal in the infl. 3-nate, pairs homo- or heterogamous. *Fl. gl.* smaller than the empty, hyaline, often awned or reduced to an awn.

Subtribe I. MAYDEÆ. *Spikelets* spicate, all 1-sexual; male spikes in terminal panicles, or continuous with the fem spike.

Fruiting spikelets enclosed in a stony, nut-like polished bract . . . . . 28. Coix.
Fruiting spikelets, having all the inner gl. concealed within the greatly enlarged hardened outer . . 29. Polytoca.
Fruiting spikelets densely crowded on a cylindric spongy rachis, grain exposed . . . . . 29*. Zea.

Subtribe II. Dimerieæ. *Spikelets* homogamous, secund on a slender inarticulate rachis, 1-fld., diandrous . . . 30. Dimeria.

Subtribe III. Saccharеæ. *Spikelets* homogamous, in compound racemes or panicles (except *Pollinia*); gl. I not sunk in a hollow of the rachis.

* *Rachis not or rarely fragile.*
Spikelets in a cylindric silvery thyrsus, 1-fld., not awned . 31. Imperata.
Spikelets panicled, 2-nate, 1-fld., awned . . . . 32. Miscanthus.

** *Rachis fragile.*
Spikelets in panicled racemes, 2-fld., awned . . . 33. Spodiopogon.
Spikelets in geminate digitate or fascicled spikes . . 34. Pollinia.
Spikelets in a thyrsus of spiciform racemes, 1-fld., awnless 35. Saccharum.
Spikelets in a thyrsus of spiciform racemes, 1-fld., awned. 36. Erianthus.

Subtribe IV. Ischemeæ. *Spikelets* many, in solitary digitate or fascicled spikes, usually heteromorphous; gl. I not sunk in a hollow of the rachis. (See *Pollinia* in *Saccharеæ*; *Vossia* in *Rottboellieæ*.)

* *Margins of gl. I of sessile spikelet inflexed.*
Spikes rarely solitary; spikelets 2-nate, 2-fld., awned . 37. Ischæmum.
Spikes solitary; spikelets 1-fld., gl. I pectinate . . 38. Eremochloa.

** *Margins of gl. I of sessile spikelet not inflexed.*
Spikes solitary; spikelets 2-nate, 1–2-fld., 2-awned . . 39. Pogonatherum.
Spikes solitary or 2-nate; spikelets 2-fld., diandrous; gl. I very broad, truncate . . . . . 40. Apocopis.
Spikes 2-nate or digitate; spikelets 1-fld. . . . 41. Arthraxon.
Spikes digitate; spikelets 2-fld.; gl. I tubercled . . 42. Thelepogon.
Spikes 2–∞-nate; spikelets 2-nate, upper alone awned . 43. Lophopogon.

Subtribe V. Apludeæ. *Spikelets* 3 on an inarticulate rachis . . . . . 44. Apluda.

Subtribe VI. Rottboellieæ. *Spikelets* homo- or hetero-gamous, 1–2-fld., solitary, or 2- rarely 3-nate on the internodes of an articulate spike or raceme, not awned (gl. I caudate in *Vossia*); gl. I not keeled, adnate to or sunk in a depression formed by the internode and pedicel of the upper spikelet; gls. of sessile spikelet 4.

Spikelets 2-nate, gl. I caudate . . . . . 45. Vossia.
Spikelets 2-nate, gl. I flat . . . . . 46. Rottboellia.
Spikelets 2-nate, gl. I globose . . . . . 47. Manisuris.
Spikelets solitary, gl. I convex . . . . . 48. Ophiurus.

Subtribe VII. Ratzeburgieæ. *Spikelets* homogamous, 3-nate on the slender internodes of a solitary flattened fragile spike, two perfect, 1-fld., third imperfect; gls. 4 . . . . . 49. Ratzeburgia.

Subtribe VIII. Euandropogoneæ. *Spikelets* heterogamous, 1-fld., 2- rarely 3-nate on the whorled articulate branches of simple or compound racemes or panicles (solitary in *Cleistachne*); gls. 4, I not keeled, IV usually awned.

Spikelets 2–3-nate, in a simple spike, gl. I with tubercled penicillate ribs . . . . . 50. ELIONURUS.
Spikelets solitary, terminating the branches of a thyrsoid panicle . . . . . 51. CLEISTACHNE.
Spikelets capitate, male sessile, 2-fld., forming an involucriform whorl round the pedicelled fem. . . . . 52. GERMAINIA.
Spikelets 2-nate, or the uppermost 3-nate, spicate, or panicled . . . . . 53. ANDROPOGON.
Spikelets in 2 superposed series; upper series of heterogamous pairs, and a terminal male, lower a whorl of 4 persistent males or neuters . . . . . 54. ANTHISTIRIA.
Spikelets as in *Anthistiria*, but male and neuter spikelets deciduous with the fem.; callus 0 . . . . . 55. ISEILEMA.

Series B. **Poaceæ.** *Spikelets* continuous (not articulate with) their pedicels, 1– many-fld.; rachilla articulate at the base, and often between the flg. gls.; lowest fl. always fruiting, upper often male or neuter.

Exceptions. Upper fl. alone bisexual in *Phalarideæ*. *Spikelets* articulate on their pedicels, or gl. I and II separately deciduous occur in *Alopecurus*, *Melica*, *Fingerhuthia*, *Cyathopus*, and *Sphærocaryon*.—See under *Panicaceæ* some genera with spikelets inarticulate at the base.

Tribe V. PHALARIDEÆ. *Spikelets* with a terminal perfect fl., and one or more imperfect male or neuter below it; rachilla not produced beyond the perfect fl.

Panicle contracted or spiciform; spikelets awnless . . 56. PHALARIS.
Panicle spiciform; gls. 6, III and IV neuter, awned; stamens 2 . . . . . 57. ANTHOXANTHUM.
Panicle lax.; gls. 6, III and IV male, awned or not . 58. HIEROCHLOA.

Subtribe VI. AGROSTIDEÆ. *Spikelets* 1-fld.; rachilla jointed at the base, produced or not beyond the flg. gl.; gls. 3, I and II empty, III flg. awned.

Exceptions. *Spikelets* sometimes 2-fld. in *Sporobolus* and *Muehlenbergia*.

Subtribe I. STIPEÆ. *Spikelets* panicled; rachilla not produced beyond gl. III; fl. gl. rigid or hard, awned (except *Milium*).

Gl. III narrow, awn 3-fld. . . . . 59. ARISTIDA.
Gl. III narrow, awn entire, grain terete . . . . 60. STIPA.
Gl. III broader, awn entire, grain dorsally compressed . 61. ORYZOPSIS.
Gl. III obovoid, awn 0, grain oblong . . . . 62. MILIUM.

Subtribe II. PHLEOIDEÆ. *Spikelets* in spiciform or subspiciform panicles, gl. III nyaline, loosely wrapping the grain; stigmas exserted from the top of the spikelet.

* *Rachilla produced beyond the flg. gl.*
Gl. I and II shorter than III . . . . . 63. HELEOCHLOA.
Gl. I and II longer than III . . . . . 64. PHLEUM.

** *Rachilla not produced.*
Gl. I and II longer than III; panicle cylindric . . 65. ALOPECURUS.
Gl. I and II minute; panicle laxly subspiciform . . 66. PHIPPSIA.

Subtribe III. EUAGROSTEÆ. *Spikelets* usually small, in open or contracted many-fld. panicles; gls. usually thin or membranous; stigmas laterally exserted from the spikelet. Spikelets rarely 2-fld. in *Sporobolus* and *Muehlenbergia*.

* Rachilla not produced beyond gl. II.

† *Spikelets articulate on their pedicels, or gl. I and II separately deciduous, or pedicel articulate in the middle.*

Spikelets oblong; gl. I and II 3-nerved, III 5-nerved, awnless . . . . . 67. CYATHOPUS.
Spikelets very narrow; gl. I and II 3-nerved, III faintly 1–3-nerved, usually awned . . . . . 68. GARNOTIA.
Spikelets compressed; gl. I and II subequal, awned, nerved . . . . . 69. POLYPOGON.
Spikelets subglobose; gl. I nerveless, II and III 1-nerved, awnless . . . . . 70. SPHÆROCARYUM.

†† *Spikelets and pedicels inarticulate, gl. I and II persistent.*

Gls. all awnless; I and II 1-nerved, pericarp of grain loose . . . . . 71. SPOROBOLUS.
Gl. I and II subequal, 1-nerved, awnless, awn of III dorsal or 0 . . . . . 72. AGROSTIS.
Gl. I and II unequal, awnless, 1-nerved, awn of III terminal . . . . . 73. MUEHLENBERGIA.
Gl. I and II 3-nerved, awnless, base of III penicillate with long hairs . . . . . 74. CALAMAGROSTIS.

** Rachilla produced beyond gl. III usually penicillate with long, silky hairs; gl. I and II 3-nerved. . 75. DEYEUXIA.

Tribe VII. AVENEÆ. *Spikelets* 2- or more fld., panicled, very rarely spicate, or panicle subspiciform; fl. gls. usually awned, awn geniculate and often twisted, rarely straight or 0; rachilla produced or not beyond the upper fl. gl.

Subtribe I. AIREÆ. *Spikelets* 2-fld.; gls. membranous; rachilla not produced.

Gl. I acute, many-nerved; fl. gl. long-ciliate . . . 76. ERIACHNE.
Spikelets minute; rachilla and keel of fl. gl. ciliate . . 77. ZENKERIA.
Spikelets awnless; gl. III largest 2-sexual, IV male . 78. COELACHNE.
Spikelets 3-nate; gl. I and II awnless, III male, cleft, awned in the cleft . . . . . 79. TRISTACHYA.
Gl. I and II awnless, III and IV bisexual, hyaline, dorsally awned . . . . . 80. AIRA.

Subtribe III. EUAVENEÆ. *Spikelets* 2- or more fld.; rachilla produced.

Spikelets 2-fld., both bisexual, awned . . . . . 81. DESCHAMPSIA.
Spikelets 2-fld., lower fl. bisexual awnless, upper male or neuter awned . . . . . 81*. HOLCUS.
Spikelets 2–6-fld.; fl. gl. awned, awn subterminal or dorsal . . . . . 82. AVENA.
Spikelets 3- or more-fld.; fl. gl. deeply cleft, awned in the cleft . . . . . 83. DANTHONIA.

Tribe VIII. CHLORIDEÆ. *Spikelets* 1- or more-fld., 2-seriate (sometimes very distantly) and secund on an inarticulate spike or on the spiciform branches of a slender panicle; fl. all or the lower only bisexual; rachilla produced or not beyond the upper fl. gl.

* *Spike solitary, terminal* (*see also* Chloris).

Spikelets minute, 1-fld., awnless . . . . . 84. MICROCHLOA.
Spikelets 1–2-fld., in pedicelled deciduous articulate clusters, awned . . . . . 85. GRACILEA.
Spikelets 1–2-fld., in sessile inarticulate clusters, awned . 86. ENTEROPOGON.
Spikelets many-fld.; fl. gl. 3-awned . . . . . 87. TRIPOGON.

** *Spikes or spiciform branches digitate, racemed or panicled* (*or solitary in* Chloris).

Spikes digitate, 1-fld., upper imperfect fl. 0 . . . 88. CYNODON.
Spikes solitary, spicate or racemed; spikelets 2- or more-fld., upper fl. imperfect . . . . . 89. CHLORIS.
Spikes digitate or whorled; spikelets 3–6-fld., densely crowded, awnless . . . . . 90. ELEUSINE.
Spikes racemed on a long rachis; spikelets 2–3-fld., awned . . . . . 91. DINEBRA.
Spikes panicled, filiform; spikelets very minute, alternate, 1- or more fld., awnless . . . . . 92. LEPTOCHLOA.
Spikes very long, filiform, simple or divided; spikelets very few, distant, 1-fld., awned . . . . . 93. DICHÆTARIA.

Tribe IX. FESTUCACEÆ. *Spikelets* 2- or more-fld., pedicelled, rarely sessile, in effuse or contracted rarely spiciform, panicles; rachilla articulate at the base and often at the base of the fl. gls., always produced beyond the uppermost fl. gl.

Subtribe I. PAPPOPHOREÆ. *Spikelets* few- or many-fld.; gls. many-nerved, fl. gls. many-awned or 4–5-lobed.

Spikelets spicate, 2–5-fld.; empty gls. 4, 2 upper and fig. 4-lobed; fl. gl. with a dorsal awn . . . . 94. POMMEREULLA.
Spikelets in simple or branched spikes; fl. gl. many-awned 95. PAPPOPHORUM.

Subtribe II. ARUNDINEÆ. *Spikelets* panicled, 2– many-fld.; gls. very narrow, fig. penicillate with long silky hairs on the callus or sides or both, lowest fl. gl. sometimes male or neuter.

Rachilla elongate, glabrous; fl. gl. silkily hairy . . 96. ARUNDO.
Rachilla very short; fl. gls. glabrous, callus with long silky hairs . . . . . 97. PHRAGMITIS.

Subtribe III. SESLERIEÆ. *Spikelets* in spiciform panicles, or in spicate clusters with (in the Indian species) many imperfect spikelets of imbricating gls. at the base of the spike or of the clusters, 1- or more-fld. (*Cynosurus* has dimorphous spikelets).

Spikelets in a cylindric spike, articulate on very short pedicels; gl. I and II awned . . . . . 98. FINGERHUTHIA.
Spikelets very minute, in globose clusters on an elongate simple rachis . . . . . 99. ELYTROPHORUS.
Spikelets in a dense unilateral panicle, uppermost of each branchlet 1-fld., concealed by the longer lower empty gls. . . . . 100. LAMARCKIA.
Spikelets in spiciform clusters, uppermost of each cluster 2–5-fld., lower of distichous subulate empty pectinately arranged gls. . . . . 101. CYNOSURUS.

Subtribe IV. ERAGROSTEÆ. *Infl.* various. *Spikelets* 2– many-fld.; fl gls. 1–3-nerved, entire, 3-toothed, 3-lobed or 3-awned.

Panicle spiciform; spikelets 2–5-fld.; fl. gls. scarious, secund, mucronate or shortly awned . . . . 102. KOELERIA.
Panicle effuse; spikelets 2–4-fld.; gl. I very short, 3-nerved, sub 3-toothed, fl. gl. broadly truncate, 3-nerved . . . . . 103. CATABROSA.
Infl. various; spikelets many-fld.; empty gls. shorter than the lowest flg. gl., 1-nerved; flg. gls. 3-nerved; grain very minute, terete . . . . . 104. ERAGROSTIS.
Infl. pyramidal; spikelets many-fld.; empty gl. longer

than the lowest, gl. II subulate, 1-nerved; flg. gls. 3-nerved; grain broad, concave . . . . 105. MYRIOSTACHYS.
Infl. subpanicled; spikelets many-fld.; empty gl. shorter than the lowest flg. gl. I 3-nerved, II 5-nerved; rachilla silky; flg. gls. 3-nerved, grain grooved . 106. HALOPYRUM.
Infl. capitate in the (Indian sp.); spikelets few or many-fld.; empty gls. shorter than the flg., I 1–3-nerved, II 5-nerved; fl. gls. 3-nerved, villous; grain broad, concave . . . . . 107. COELACHYRUM.
Spikelets sessile on the spiciform branches of a tall, broad panicle, many-fld.; fl. gls. 3–4-toothed . . . 108. DIPLACHNE.

Subtribe V. MELICEÆ. *Spikelets* usually panicled, 1– or more-fld.; gls. many, upper smaller, empty, convolute in a clavate mass.

Gl. I and II separately deciduous . . . . . 109. MELICA.

Subtribe VI. CENTOTHECEÆ. *Spikelets* 1– many-fld., 1–2-seriate on the rachis of a simple spike or on the long slender branches of a simple panicle.—Leaves broad, tessellately nerved.

Spikelets 1-fld., secund and articulate at the base; upper gls. empty, convolute with setiform tips . . . 110. LOPHATHERUM.
Spikelets 3- or more-fld., secund, persistent; fruiting gls. with reflexed submarginal bristles . . . . . 111. CENTOTHECA.
Spikelets 1–4-fld., secund, 2-seriate on the rachis of a simple spike . . . . . 112. STREPTOGYNE.

Subtribe VII. EUFESTUCEÆ. *Spikelets* usually panicled, 2- or more-fld.; fl. gls. 5– many- (very rarely 3-) -nerved, upper empty or 0; styles short except *Duthiæa*). (Spikelets of *Brachypodium* in long very lax spikes of *Æleuropus* in crowded spikes.)

Spikelets many-fld., subspicately crowded; fl. gl. broad, many-nerved. Prostrate, leaves rigid, pungent . 113. ÆLEUROPUS.
Spikelets few-fld., in close secund clusters; gl. I and II shorter than the mucronate or awned flg. . . . 114. DACTYLIS.
Spikelets on a short panicle, subsessile, compressed; fl. gls. keeled, tips membranous. Annuals . . . . 115. SCLEROCHLOA.
Spikelets very small, in a narrow panicle with erect branches, awnless. Annuals . . . . . 116. SCHISMUS.
Spikelets ovate, in a lax pyramidal panicle, pendulous; gls. inflated, awnless, closely imbricate, many-nerved, dorsally convex . . . . . 117. BRIZA.
Spikelets laxly panicled, few-fld.; gls. keeled, 5-nerved (3- in *P. persica*), awnless, nerves rarely meeting at the tip . . . . . 118. POA.
Spikelets laxly panicled, 1–2-fld., awnless; gls. hyaline, flg. very broad, truncate, 5-nerved, lateral nerves very short . . . . . 119. COLPODIUM.
Spikelets panicled, many-fld., awnless; gls. obtuse, dorsally rounded, 5–9-nerved, lateral nerves short . . . 120. GLYCERIA.
Spikelets panicled, many-fld.; fl. gls. acute or awned, dorsally rounded, top of ovary naked or hairy . . 121. FESTUCA.
Spikelets panicled, 3– many-fld.; fl. gls. mucronate or awned, dorsally rounded, 5–9-nerved, top of ovary lobed villous . . . . . 122. BROMUS.
Spikelets few, sub-capitate, 3–5-fld.; fl. gls. 7–11-nerved, 2-fid; style very long, 2-fid . . . . . 123. DUTHIÆA.
Spikelets spicate, many-fld., mucronate or awned . . 124. BRACHYPODIUM.

Tribe X. HORDEÆ. *Spikelets* 1- or more-fld., sessile, 1–2 or more seriate on the rachis of a simple spike, or partially sunk in cavities of the same; rachilla usually articulate and produced beyond the flg. gls. into a naked or glumiferous bristle; gls. awned or not, I and II opposite or subcollateral, persistent or separately deciduous, I sometimes absent or very minute.

Subtribe I. LOLIEÆ. *Spikelets* solitary at the nodes of the spike; plane of the spikelets radial to the rachis.

Spikelets 3– many-fld.; gls. coriaceous, I absent, except in the terminal spikelet . . . . . 125. LOLIUM.
Spikelets 1–2-fld.; gl. I, minute or 0, II much longer than the hyaline III; spike cylindric, rachilla glabrous . . . . . 126. LEPTURUS.
Spikelets 1–3-fld.; gl. I, minute or 0, II about as long as the hyaline III; spike compressed, rachilla hairy . 127. OROPETIUM.

Subtribe II. TRITICEÆ. *Spikelets* solitary at the nodes of the spike; plane of spikelets tangential to the rachis.

Fl. gls. 5–9-nerved, lateral nerves not conniving, short or ending in teeth or awns . . . . . 128. TRITICUM.
Fl. gls. 5–7-nerved, lateral nerves conniving or confluent with the single terminal awn . . . . . 129. AGROPYRUM.

Subtribe III. ELYMEÆ. *Spikelets* 2 or more, collateral or fascicled at the nodes of the spike; plane of spikelets tangential to the rachis.

Spikelets 1-fld.; empty gl. subulate, rigid . . . 130. HORDEUM.
Spikelets 2– many-fld.; empty gl. subulate, linear or oblong . . . . . 131. ELYMUS.

Tribe XI. BAMBUSEÆ. Shrubby or arboreous grasses. *Leaves* flat, jointed on the sheath. *Spikelets* 1–∞-fld.; lower 2- or more gls. empty, gradually increasing in size up to the flowering, with sometimes small terminal imperfect ones. *Palea* usually large, 2-keeled (in *Melanocanna*). *Lodicules* usually 3. *Stamens* 3, 6, or ∞. *Styles* 2–3.

Subtribe I. ARUNDINARIEÆ. Palea 2-keeled; stamens usually 3; pericarp thin, adnate to the seed.

Spikelets 1– many-fld., racemed or panicled; empty gls. 1–2 . . . . . 132. ARUNDINARIA.
Spikelets 1–4-fld., spicate; spathes bracteate; empty gls. 2–3 . . . . . 133. PHYLLOSTACHYS.

Subtribe II. EUBAMBUSEÆ. Palea usually 2-keeled; stamens 6; pericarp thin, adnate to the seed.

Filaments free; paleas entire or slightly cleft, all 2-keeled 134. BAMBUSA.
Filaments free; paleas deeply cleft, uppermost not keeled 135. THYRSACANTHUS.
Filaments connate. Spikelets ∞-fld.; paleas all 2-keeled 136. GIGANTOCHLOA.
Filaments connate. Spikelets few-fld.; palea of upper fl. 0 or glume-like, not keeled . . . . . 137. OXYTENANTHERA.

Subtribe III. DENDROCALAMEÆ. Palea 2-keeled; stamens 6; pericarp fleshy or crustaceous; seed free.

Spikelets 2–∞-fld., 1 only usually fertile, usually capitate in the branches of the panicle; ovary hirsute at the top, pericarp crustaceous . . . . . 138. DENDROCALAMUS.

Spikelets 2-fld. as in *Dendrocalamus*; ovary glabrous at the top, fruit large, pericarp fleshy . . . . 139. MELOCALAMUS.
Spikelets 1-fld., loosely spiked on the branches of the panicle, bracteate; fruit small, depressed-globose; pericarp crustaceous . . . . . 140. PSEUDOSTACHYUM.
Spikelets 1-fld. as in *Pseudostachyum*; fruit elongate beaked, pericarp crustaceous, ... 141. TEINOSTACHYUM.
Spikelets 1-fld., bracteate, crowded in globose heads; fruit oblong, beaked, pericarp thick, separable . . . 142. CEPHALOSTACHYUM.

Subtribe IV. MELOCANNEÆ. *Spikelets* 1-fld. *Palea* 0 or glume-like. *Stamens* 6–∞. *Pericarp* crustaceous or fleshy, seed free.

Spikelets in clusters on the branches of the panicle, rachilla produced far beyond the fl. gl.; fruit small, pericarp hard . . . . . 143. SCHIZOSTACHYUM.
Spikelets very minute, clustered on the branches of the panicle, rachilla not produced; lodicules 0 . . 144. DINOCHLOA.
Spikelets bracteate, crowded in unilateral spikes, rachilla not produced; fruit very large, fleshy . . . 145. MELOCANNA.
Spikelets large, capitate or subspicate; stamens 6 or more; fruit very large, pericarp fleshy . . . . 146. OCHLANDRA.

EXCLUDED GENUS.

PRIONANTHIUM, *Desv. Opusc.* 65 t. 4, is a S. African grass, erroneously described as Indian. It was subsequently published by Nees as *Prionachne Ecklonii*.

Tribe I. PANICEÆ. (See p. 2.)

1. PASPALUM, *Linn.*

Annual or perennial grasses. *Spikelets* 1-fld., secund in simple spikes or spikelike branches of a simple panicle or raceme, articulate on the pedicel but not thickened and callous at the base, never awned. *Glumes* 3 (homologous of II III and IV in *Panicum*), with rarely a very minute lowest fourth (I of *Panicum*); I and II subequal, membranous, both sometimes very small or I (at the back of the fl. gl.) absent; II. epaleate; III more coriaceous, paleate, bisexual. *Stamens* 3. *Styles* 2, free. *Grain* free within the hardened glume.—Species perhaps about 160, natives of all warm regions.

As above defined, *Paspalum* includes the *Digitaria* section of *Panicum*, which appears to me to be artificially placed in the latter genus, because of the occasional presence of a very minute scale-like glume at the base of what is the 3rd gl. of *Panicum* (that opposite the flg.). This minute glume which is present or absent even in the same species, is nerveless and never embraces that above it, as the lowest gl. always does in *Panicum* proper. One Indian species alone of *Panicum* (*P. subeglume*) has only 3 glumes, but its decompound panicle and the form of its spikelets and its affinities are with *Panicum*.

* Spikelets orbicular or broadly oblong, ovate-oblong in *P. distichum*.

1. **P. scrobiculatum,** *Linn. Mant.* i. 29; spikelets about as broad as the flat rachis $\frac{1}{12}$–$\frac{1}{8}$ in. diam. 2–4-ranked plano-convex or hemispheric, gl. I 3-nerved, II 5-nerved. *Fluegge Monogr. Gram.* 86 (Paspalus); *Trin. Diss.* ii. 122, *Gram. Panic.* 56, *Sp. Gram. Ic.* t. 143; *Kunth Enum. Pl.* i. 53; *Steud. Syn. Gram.* 21; *Roxb. Fl. Ind.* i. 278; *Grah. Cat. Bomb. Pl.* 234; *Dalz. & Gibs. Bomb. Fl. Suppl.* 97; *Thw. Enum. Pl. Zeyl.* 357; *Trim. Cat. Pl. Ceyl.* 104; *Aitchis. Cat. Panjab Pl.* 104; *Wall. Cat.* n. 8753; *Wight Cat.* n. 1601; *Duthie Field and Gard. Crops*, 8 t. 27; *Grasses N.W. Ind.* 1; *Indig. Fodd. Grass.* t. 1; *Fodd. Grass. N. Ind.* 1; *Miq. Fl. Ind. Bat.* iii. 430; *Benth. Fl. Hongk.* 408, *Fl.*

Austral. vii. 460. P. alternans, *Steud. l. c.* 26. P. auriculatum & cartilagineum, *Presl Rel. Haenk.* i. 217, 216. ? P. bifarium, *Edgew. in Journ. As Soc. Beng.* xxi. (1853) 178. P. coloratum, *Rich. ex Doell in Mart. Fl. Bras.* ii. II. 78. P. Commersoni, *Lamk. Illustr.* i. 175. P. coromandelianum, *Lamk. l. c.*; *Kunth l. c.* 55; *Steud. l. c.* 32. P. dissectum, *Linn. Syst.* ii. 86. P. dimidiatum, *Linn. Syst. Ed.* x. 855. P. firmum, *Trin. Gram. Panic.* 105, *Sp. Gram. Ic.* t. 125; *Kunth l. c.* 60. P. flexuosum *Klein ex Presl l. c.* 215; *Kunth l. c.* 54; *Miq. Fl. Ind. Bat.* iii. 432. P. frumentaceum, *Rottb. ex Roem. & Sch. Syst.* ii. 296; *Koen. ex Trin. Gram. Panic.* 57; *Kunth l. c.* 53. P. hirsutum, *Retz. Obs.* ii. 7; *Kunth l. c.* 33; *Miq. l. c.* 433. P. Houttuynii, *H. C. Hall ex de Vriese in Pl. Ind. Bat. Reinw.* 113. P. Kora, *Willd. Sp. Pl.* i. 332; *Host Gram. Austr.* t. 74; *Beauv. Fl. Owar.* ii. 5, t. 61; *Roxb. l. c.*; *Grah. l. c.*; *Duthie Indig. Fodd. Grass.* t. 2. P. longifolium, *Roxb. l. c.* 280; *Trin. Sp. Gram. Ic.* t. 138; *Wight Cat.* n. 1602, *Herb.* n. 1600. P. mauritanicum, *Nees ex Steud. l. c.* 26. P. metabolon, P. Metzii, and P. mollipilum, *Steud. l. c.* 19, 21, 29. P. orbiculare, *Forst. Prodr.* 7; *Fluegge l. c.* 88. P. polystachyum and P. pubescens, *Br. Prodr.* 188; *Kunth l. c.* 54, 55. P. puberulum, *Roem. & Sch. Syst.* ii. 316 (Paspalus). P. sumatrense, *Roth Nov. Sp.* 35; *Kunth l. c.* 55. P. Thunbergii, *Kunth ex Steud. l. c.* 28; *Franch. & Sav. En. Pl. Jap.* 159. P. venustum, *Forst. f. ex Roem. & Sch. l. c.* 297. P. Zollingeri, *Steud. l. c.* 28. Panicum dissectum, *Linn. Sp. Pl.* 57.—Paspalum, *Wall. Cat.* n. 8754.—*Rheede Hort. Mal.* xii. t. 84.—*Sloane Hist. Jam.* i. t. 69, f. 2.

Throughout hotter INDIA (wild or cultivated), from the Panjab eastwards and southwards to Singapore and Ceylon.—DISTRIB. All warm countries.

Annual, erect or base very shortly decumbent, 1–6 ft. high, leafy, glabrous or rarely hairy. *Leaves* acuminate; ligule short, membranous. *Peduncle* rather slender. *Spikes* 2–8, 1–3 in. long, alternate, erect or spreading; rachis $\frac{1}{12}$–$\frac{1}{10}$ in. broad, margins ciliate or serrulate. *Spikelets* in 2, rarely 3–4 rows, imbricate, glabrous or sparsely pubescent, sometimes geminate on a common pedicel; gl. I convex; II flat with two submarginal strong nerves, along the inner margins of which the gl. is sometimes marked with shallow transverse pits (whence the specific name); gl. III with inflexed auricled margins.—I find it impossible to classify the large series of specimens of this variable plant under available varieties. Roxburgh regarded the Indian forms as 3 species, *scrobiculatum*, *Kora*, and *longifolium*. Between the first two of these he gives no differential characters, beyond that of *scrobiculatum* having erect stems 2 ft. high and being a cultivated form, whereas *Kora* is indigenous growing on the banks of watercourses and attaining 8 ft. (? error for 3 ft., as in the description that follows) and has the stem decumbent at the base. *P. longifolium* he separates by the creeping stems, geminate terminal spikes and pitted seeds, but as Trinius describes the pitting is microscopic (as in other forms of the species). Having regard to the specimens before me, I recognize with more or less confidence (1) a form with larger dorsally tumid spikelets, which I assume to be the cultivated form (including *orbiculare*, *frumentacum*, *Kora*, *coromandelianum*, and *hirsutum*); its gl. II either pitted or not; and (2) a form with rather smaller spikelets, often in 3–4 rows and gl. II never pitted, to which I refer *longifolium*, *Zollingeri*, and *dissectum* (which latter is the earliest name (under *Panicum*) of the species). This abounds all over India, and is the only form of which I have seen Malayan specimens. Besides the synonyms adduced above, as to which I am pretty well assured, there may be perhaps many more to be added.

2. **P. conjugatum,** *Berg. in Act. Helvet.* vii. (1772) 129, t. 8, spikes 2 terminal or subterminal very slender, spikelets $\frac{1}{16}$ in. subsessile, orbicular nearly flat, gl. II hyaline margins villously ciliate. *Sw. Fl. Ind. Occ.* i. 133; *Fluegge Monogr. Gram.* 102 (Paspalus); *Beauv. Fl. Owar.* 56, t. 92, f. 2; *Trin. Panic. Gen.* 54, *Sp. Gram. Ic.* t. 102; *Kunth Rev. Gram.* 25, *Enum. Pl.* i. 51; *Trim. Cat. Ceyl. Pl.* 104. P. bicrurulum

bicrurum, *Saltzm. ex Doell in Mart. Fl. Bras.* ii. II. 55. P. ciliatifolium, *Trin. in Mem. Acad. Petersb. Ser.* vi. iii. 11. (1835), 340. P. ciliatum, *Lam. Illustr.* i. 175. P. dolichopus, *Trin. ex Steud. Nom.* ed. 2, ii. 271. P. eriophorum, *Willd. ex Nees Agrost. Bras.* 56. P. hirsutum, *Poir. Encycl* v. 28. P. longissimum, *Hochst. ex Steud. Syn. Gram.* 19. P. nutans, *Lam. Illustr.* i. 175. P. Renggeri, *Steud. l. c.* 17. P. protensum, *Trin. Gram. Panic.* 108. P. pubescens, *Muhlb. ex Willd. Enum. Hort. Berol.* 89. P. supinum, *Bosc ex Poir. Encycl* v. 29. P. tenue, *Gærtn. Fruct.* ii. 2, t. 80. Digitaria conjugata, *Schult. Mant.* ii. 262.—Paspalus, *Wall. Cat.* n. 8756.

Cachar, *Keenan.* Penang, *Curtis*, &c. Singapore, *King.* Ceylon, *Thwaites* ("introd. from W. Indies.")—Distrib. Trop. and subtrop. regions.

Annual. *Stems* 1–2 ft., creeping and branching below. *Leaves* 4–6 by $\frac{1}{4}$ in., or less, margins of sheath above, and mouth ciliate. *Peduncle* very slender. *Spikes* 3–7 in., usually geminate and divergent, rachis glabrous. *Spikelets* imbricate, very pale, plano-convex; glumes with marginal, villous nerves, and an obsolete median; III coriaceous, apiculate, white.—A very elegant grass.

3. **P. compactum,** *Roth Nov. Sp.* 36; dwarf, hairy all over, spikes forming a pyramidal raceme, rachis slender triquetrous, spikelets $\frac{1}{20}$ in. hemispheric. *Kunth Enum. Pl.* i. 61; *Steud. Syn. Gram.* 31. P. costatum, *Hochst. in Herb. Hohenack.* n. 635. P. miliaria, *C. Muell. in Bot. Zeit.* xix. (1861), 325. P. porrigens, *Arn. in Herb. Wight.* Panicum Canaræ, *Steud. l. c.* 58. Pan. imperfectum, *Roxb. ex Kunth l. c.*

Khasia Hills, in wet places, alt. 3–5500 ft., *Griffith*, &c. Rajputana; Mt. Aboo, *Duthie.* The Concan and Canara, *Jacquemont*, &c. Nilghiri Hills, *Lawson.*

Stem 6–10 in., decumbent, and branched below; roots stiff, wiry. *Leaves* 1–2 by $\frac{1}{3}$–$\frac{1}{2}$ in., ovate-lanceolate, acuminate, hairy on both surfaces. *Raceme* 2–4 in.; spikes many, upper gradually shorter; axils usually ciliate. *Spikelets* rather turgid, close-set, but not imbricate, pendulous by short pedicels; gl. I orbicular, obscurely 3-nerved; II narrower, margins broadly hyaline; III plano-convex, white, coriaceous, tip rounded.

4. **P. distichum**, *Linn. Amœn. Acad.* v. 391; stem creeping and rooting, leaves narrow distichous, spikes geminate, spikelets $\frac{1}{8}$ in. ovate-oblong, appressed to the rachis, gl. I and II equal acute membranous, III acute. *Burm. Fl. Ind.* 23; *Sw. Obs.* 35, t. 2, f. 1; *Gærtn. Fruct.* ii. 2, t. 80; *Kunth Enum. Pl.* i. 52; *Benth. Fl. Austral.* vii. 460; *Baker Fl. Maurit.* 431. P. brachiatum, *Trin. ex Nees Agrost. Bras.* 62. P. depressum, *Steud. Syn. Gram.* 20. P. didactylum, *Saltzm. ex Steud. l. c.* P. digitaria, *Poir. Encycl. Suppl.* iv. 316. P. distachyon, *Willd. ex Doell in Mart. Fl. Bras.* ii. II. 73. P. Fernandesianum, *Colla in Mem. Acad. Turin.* xxxix. (1836), 27. P. fissifolium, *Nees ex Doell l. c.* 104. P. furcatum, *Fluegge Gram. Monogr.* 114 (Paspalus). P. geniculatum, *Heyne in Herb. Rottl.* P. Kleinianum, *Presl Rel. Hænk.* i. 209; *Steud. l. c.* 19. P. Kora, *Forst. ex Spreng. Syst.* i. 244. P. littorale, *Br. Prodr.* 188; *Trin. Diss.* ii. 95, *Sp. Gram. Ic.* t. 112; *Kunth Enum. l. c.* 51. P. longiflorum, *Retz. Obs.* iv. 15, *ex Roxb. Fl. Ind.* i. 279; *Beauv. Fl. Owar.* ii. 46, t. 85, f. 1; *Grah. Cat. Bomb. Pl.* 231. P. maculosum, *Trin. Gen. Panic.* 98, *Sp. Gram. Ic.* t. 113. P. Michauxianum, *Kunth Revis. Gram.* i. 25. P. notatum, *Fluegge l. c.* 106. P. obtusatum, *Nees ex Doell, l. c.* 103. P. obtusifolium, *Trin. Sp. Gram. Ic.* t. 115. P. platycaule, *Willd. ex Steud. Nom.* ed. 2, ii. 272. P. repens, *Ic. Roxb.* n. 779. *ined.* P. reptans, *Poir. ex Doell l. c.* 75. P. serpentinum, *Hochst. ex Steud. l. c.* 22. P. tristachyum, *Leconte in Journ. Phys.* xii. (1820), 285. P. vaginatum, *Sw. Prodr. Veg. Ind. Occ.* 21; *Fluegge l. c.* 108 (Paspalus); *Beauv. l. c.* ii. 53, t. 92; *H. B.*

& K. Nov. Gen. & Sp. i. 91; *Trin. Diss.* ii. 94, *Panic. Gen.* 53, *Sp. Gram. Ic.* t. 120; *Kunth Enum.* 52; *Steud. l. c.* 20. Panicum polyrhizum, *Presl l. c.* i. 296. Pan. vaginatum, *Gren. & Godr. Fl. Fr.* iii. 462.—Paspalus, *Wall. Cat.* n. 8757?—*Rheede Hort. Mal.* xii. t. 44.

N. W. India, *Duthie.* Sunderbunds, *Roxburgh, J. D. H. & T. T.* Malabar, *Rheede.* Carnatic, *Heyne.* Malacca, *Griffith.* Andaman Islds., *Prain.*—Distrib. warm countries.

Stems 1–6 in., erect or inclined from the long creeping base, usually stout, compressed below. *Leaves* 2–4 in., strict, flat or involute, glabrous or sparsely hairy towards the flattened sheath. *Spikes* close together, 1–1½ in., rachis narrower than the 2-seriate spikelets. *Glumes* faintly nerved.—Apparently a rarer plant in India than in most tropical countries. Andaman Isld. specimens have a stout, woody, creeping stem, with thickened nodes, and very short, erect flowering branches, with distichous, subulate, spreading leaves, and spikes partially exserted from the uppermost sheath.

** Spikelets ovoid, ellipsoid, or lanceolate.

† *Spikelets* $\frac{1}{10}$–$\frac{1}{8}$ *in. long, with often a minute scale-like gl. at the base of gl. II* (Digitaria, *Auct.*).

5. **P. sanguinale,** *Lamk. Illustr.* i. 176; spikelets $\frac{1}{16}$–$\frac{1}{10}$ in. oblong or lanceolate acute or acuminate, gl. I.=$\frac{3}{4}$ III or shorter or 0, II 5-nerved with or without a minute basal gl. III and its palea oblong-lanceolate acuminate. *D.C. Bot. Gall.* iii. 16 P. ægyptiacum, *Poir. Encycl. Suppl.* iv. 314. P. bicorne, *Lam. l. c.* 176 *Poir. Encycl.* v. 29, *Suppl.* 306. P. blepharophorum, *Roem. & Sch. Syst* ii. 292. P. ciliare, *DC. Fl. Fr. Suppl.* 250. P. consanguineum, *Kunth Enum. Pl.* i. 46. P. corymbosum, *Kunth Enum.* 48; *Revis. Gram.* i. 28 P. distans, *Nees ex Trin. Gram. Panic.* 83. P. filiforme, *Steud. Nom.* ed. i 586. P. inæquale, *Link. Enum. Hort. Berol.* i. 103. P. oxyanthum *Steud. Syn. Gram.* 27. P. reimarioides, *Brongn. Bot. Voy. Coquillo*, t. 20 Panicum sanguinale, *Linn. Sp. Pl.* 57; *Schreb. Beschr. Graes.* t. 16; *Fl Dan.* t. 388; *Host Gram. Austr.* ii. t. 17; *Lamk. Encycl. Bot.* t. 849 *Knapp Gram. Britt.* t. 12; *Trin. Sp. Gram. Ic.* t. 93, 94, 144 *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104; *Aitchis. Cat Panjab. Pl.* 161; *Duthie Indig. Fodd. Grass.* t. 8, *Grass. N.W. Ind.* 2; *Bentl. Fl. Hongk.* 410, *Fl. Austral.* vii. 469; *Baker Fl. Maurit.* 435; *Boiss. Fl Orient.* v. 433. Pan. ægyptiacum, *Retz. Obs.* iii. 8; *Roxb. Fl. Ind.* i. 293 *Dalz. & Gibs. Bomb. Fl.* 291; *Griff. Notul.* iv. 17, *Ic. Pl. Asiat.* t. 139, f. 131 Pan. adpressum, *Willd. in Ges. Naturf. neue Schrift.* iv. (1803), 193 *Kunth Enum. Pl* i. 84. Pan. bicorne and biforme, *Kunth Revis. Gram* i. 33; *Enum* i. 83, 84. Pan. ciliare, *Retz. Obs.* iv. 16; *Kunth Enum* i. 82; *Host Gram. Austr.* iv. t. 15; *Br. Prodr.* i. 192; *Roxb. Fl Ind.* i. 290; *Dalz. & Gibs. l. c.* 290; *Thw. Enum.* 358; *Griff. l. l. c.* 32, t. 139, f. 65; *Duthie Indign. Fodd. Grass.* t. 9; Pan. commutatum, *Nees in Linnæa*, vii. (1832), 274; *Benth. Fl. Hongk.* 410. ? Pan corymbosum, *Roxb. l. c.* 292. Pan. didactylum, *Kunth l. l. c. c.* 33, 84 *Baker Fl. Maurit.* 435. Pan. eriogonum, *Schrad. Pl. Hort. Goett. fasc. ex Schult. Mant.* ii. 253; *Kunth l. l. c. c.* 33, 82. Pan. filiforme, *Jacq. Ob* iii. 18, t. 70. Pan. horizontale, *Mey. Prim. Fl. Esseq.* 54; *Kunth Enum.* 81. Pan. Linkianum. *Kunth Revis. Gram.* i. 33. Pan. pabulare, *Aitch. Hemsl. in Journ. Linn. Soc.* xix. (1882), 190; *Boiss. Fl. Orient.* v. 43 Pan. pruriens, *Fisch. ex Trin. Diss.* ii. 77, *Gen. Pan.* ii. 77, *Sp. Gram. I* t. 92; *Kunth Enum.* i. 83. Pan. radicosum, *Presl Rel. Hænk.* i. 297 *Kunth l. c.* 81. Pan. Rottleri, *Kunth Revis. Gram.* i. 33; *Enum. l. c.* 8 Digitaria ægyptiaca & biformis, *Willd. Enum. Hort. Berol.* 92, 93. I

australis, *Willd. ex Trin. in Mem. Acad. Petersb. Ser.* vi. iii. (1835), II. 201. D. ciliaris, *Pers. Syn.* i. 85: *Ledeb. Fl. Ross.* iv. 468; *T. Nees Gen. Fl. Germ. Monoc.* n. 16; *Reichb. Ic. Fl. Germ.* i. t. 27; *Miq. Fl. Ind. Bat.* iii. 436; *Ledeb. Fl. Ross.* iv. 468. D. commutata, *Schult. Mant.* ii. 262. D. didactyla, *Willd. l. c.* 91. D. distachya, *Bojer Hort. Maurit.* 363; *Lamk. Illustr.* t. 43, f. 2. D. eriantha, *Steud. in Flora*, xii. (1829), 468. D. eriogona *Link Enum. Hort. Berol.* i. 227, *in Flora, l. c.* D. horizontalis, *Willd. l. c.* 92. D. linearis, *Pers. l. c.* D. marginata, *Link. l. c.* 102. D. nervosa, *Roem. & Sch. Syst.* ii. 473. D. nodosa, *Webb & Berth. Phyt. Canar.* iii. III. 384, t. 246. D. pruriens, *Büse in Pl. Jungh.* 379; *Miq. l. c.* 436. D. radicosa, *Miq. l. c.* 437. D. repens, *Willd. ex Kunth l. c.* 81. D. Rottleri, *Roem. & Sch. l. c.* 471. D. sanguinea, *Scop. Fl. Carniol.* 72; *Weber in Willd., Prim. Fl. Holsat.* 6. D. sanguinalis, *Scop. l. c.* ed. 2, i. 52; *Reichb. l. c.* t. 87; *Parlat. Fl. Ital.* i. 125 (*with full citations*). D. sanguinoleuta, *Edgew. ex Aitch. Cat. Panjab. Pl.* 161. D. setigera, *Roth ex Roem. & Sch. l. c.* 474. Dactylon sanguinale, *Vill. Delph.* ii. 69. Phalaris velutina, *Forsk. Fl. Æg. Arab.* 17. Syntherisma vulgare, *Schrad. Fl. Germ.* i. 161. *S. ciliare, Schrad. l. c.* t. 3, f. 7. ? Axonopus corymbosus, *Schult. Mant.* ii. 77.

Throughout India, in dry and moist situations, ascending the Himalaya to 3100 ft. (cult. in the Khasia Hills).—Distrib. all warm countries.

Annual or perennial. *Stem* 2 in. to 3 ft., erect or ascending from a creeping, branching base. *Leaves* very variable, 1–12 by $\frac{1}{6}$–$\frac{1}{3}$ in.; sheaths rarely hairy, except at or near the mouth. *Spikes* 1–3 in., rarely more, usually strict; rachis trigonous or flattened, stout or slender, or winged, wings green, rarely more than twice the breadth of the midrib, margins smooth or ciliolate. *Spikelets* geminate, loosely or closely imbricate, rarely scattered; gls. often silkily hairy along the margins and nerves. The hairs in the upper spikelet of var. *ciliare* sometimes abnormally developed into a long beard or brush of curved cilia; there is every gradation between the most densely bearded and almost glabrous spikelets (see also *P. heteranthum*); gl. I (at the back of the fig. gl.) variously developed from an obscure tuft of hairs to nearly as long but not quite so broad as III, 3–5-nerved, usually silky; II 5-nerved, lateral nerves marginal, rarely all close together, and with the interspaces thickened, when the gl. appears many-nerved; III. lanceolate or oblong-lanceolate, smooth.—The above definition embraces a wide range of forms, which I believe are all referable to *P. sanguinale*. The species is one of the very commonest plants in India, and in all warm countries. A form (var. *commutatum*) is cultivated in the Khasia Hills, of which fact I find no notice in any work on Indian food grains. The following attempt to classify the Indian forms is founded on a close study of an enormous collection of specimens from all parts of India, amongst which those of Mr. C. B. Clarke are especially noteworthy. As to the result, I am satisfied that no two botanists working independently over the same materials would arrive at the same, or agree in any other; and that the results of working over a large collection from any other country would again be different. I have made no attempt to deal with the American forms, at which I have only glanced; they suggest no modification of my arrangement of the Indian.

Var. 1. *cruciatum*; spikes several 2–3 in. usually horizontal, rachis slender trigonous narrowly or rather broadly winged, spikelets ovate-oblong acute or cuspidately acuminate rather loosely imbricate quite or nearly glabrous purple or green, gl. II half as long as III ovate-oblong obtuse 3-nerved, III ovoid or obovoid rather turgid cuspidately acuminate. Panicum cruciatum, *Nees ex Steud. Syn. Gram.* 39. P. sanguinale, *Wall. Cat.* n. 8681. *K.P.*—Panicum, *Wall. Cat.* n. 8728. Digitaria cruciata, *Nees ex Herb. Strach.* v. *Winterb.* No. 3.—Himalayan region, alt. 5–8500 ft., from Iskardo and Kashmir to Sikkim and the Munnipore

hills.—This form appears to me to be most nearly allied of any in habit and spikelets to *Pasp. ambiguum.*

Var. 2. *commutatum*; usually tall, stout or slender, tufted or prostrate and widely creeping below, leaves rather long, spikes few or many (up to 20) 3–6 in. long fastigiately or subcorymbosely arranged, lower often whorled or fascicled, rachis slender narrowly winged, spikelets broad rather crowded shortly pedicelled, gl. I lanceolate rather shorter and narrower than III, II with the lateral nerves glabrous or pubescent, and with usually a minute gl. at the base, III lanceolate acuminate. Pan. commutatum, *Nees in Herb. Royle*; Digit. ciliaris? *Wight Cat.* n. 1609, *Herb.* n. 3033; Pasp. paniculatum, *Herb. Jacquemont.*; Pan. sanguinale, *Herb. Strach. & Wint.* n. 1. P. ciliare, *Thwaites* (C.P. n. 861, 862).—Panicum, *Wall. Cat.* n. 8681 A (racemosum, *Herb. Heyne*) B.C. (filiforme, *Herb. Heyne*) E.F.H.I.M.N.O.P.; P. filiforme and tenuifolium, *Heyne in Herb. Rottl. l.c.* ? P. corymbosum, *Roxb. l.c.* P. filiforme, *Roxb. Ic. ined.*—Throughout India, especially in the hills, ascending to 7000 ft. along the Himalaya, and to 10,000 in Western Tibet. —(Asia, Africa.) This is the typical S. African *Pan. commutatum*, Nees, but I am doubtful as to its being the *P. corymbosum*, Roxburgh, which is described as found "only in valleys of the Circars, growing to a great size in standing waters, with culms creeping, or floating with their erect extremities above water; when found on dry ground it is in general 1–4 ft. high, *Roxb.*" A specimen of var. *commutatum* in Herb. Kew is labelled *Pan. filiforme* in Roxburgh's handwriting, but probably the ticket is misplaced.

Var. 3, *ciliare*; usually tall, slender, spikes few (2–6) 3–6 in. long, rachis slender narrowly winged, gl. I long or short ciliate, gl. II of lower spikelet, with glabrous or sparingly villous, marginal nerves, of upper spikelet with the marginal nerves densely villous or bearded with soft spreading hairs that are much broader than the gl. and often hooked at their tips. P. ciliare, *Retz.*; *Wall. Cat.* n. 8682).—Digitaria ciliaris, var. quadristachya, *Wight Herb.* n. 3034. D. commutata, *Herb. Strach. & Winterb.* n. 2. The bearded glumes may occur in other of the varieties here enumerated (as in var. *debile* from the Nicobars) as it is only when the spikelet is well advanced that the beard appears to be fully developed.—Very common.

Var. 4, *pabulare*; perennial, tall, strict, erect, spikes very many 3–7 in., rachis slender trigonous, spikelets rather distant narrowly lanceolate acuminate silkily villous white, gl. I as long as III 3-nerved, II with approximate nerves and usually a minute accessory gl. at its base, III very narrow acuminate. Pan. pabulare, *Aitchis. & Hemsl. l. c.*—The lower hills of the Panjab, Affghanistan, and Beluchistan, *Jacquemont*, &c.

Var. 5, *pruriens*; erect, glabrous, or sheaths hirsute, spikes many 3–5 in., rachis slender trigonous, spikelets narrowly lanceolate acuminate nearly glabrous, gl. I nearly as long as III, II very narrow, with approximate nerves and a minute basal gl., III very narrow acuminate. Pan. pruriens, *Fisch. l. c.*—Bengal, *Wallich* (*Cat. n.* 8681, L.). Burma, *Griffith*, Malacca, *Cuming* (n. 2397), *Maingay* (*Kew Distrib.* 1729), (Java, &c.).—Hardly different from var. *extensum*.

Var. 6, *Griffithii*; spikes several 2–4 in. long very slender often drooping, rachis filiform trigonous, spikelets linear-lanceolate solitary or in distant pairs glabrous or ciliate, pedicel of upper often longer than the spikelets, gl. I nearly as long as III narrow 5-nerved ciliate, II with ciliate lateral nerves, III narrow acuminate. Panicum Griffithii, *Arn. in Herb. Wight.* Pan. corymbosum, *Thw. Herb.* (C.P. 3800). Pan. dissitiflorum, *Nees & Arn. in Wight Cat.* n. 2341 (*not of Steud.*). Pan. sanguinale, *Wall. Cat.* n. 8681, D.G. and 8748. Pan. Rottleri, *Kunth* (nervosum, *Willd.*) *Herb. Wight.* n. 1610 (*not of Kunth Revis. Gram.*) —Panicum? *Wall. Cat.* n. 8748.—Madras, Burma, Ceylon.—This resembles *Pan. commutatum*, but has filiform spikes of scattered, longer pedicelled spikelets. It occurs in S. Africa, and no doubt elsewhere. There is no locality on Arnott's ticket of *Griffithii*, which is doubtless from the Madras peninsula, he has added to it, *Wight Cat.* n. 2057, which is Pan. horizontale, *var.* macanthrum, *Nees*, of which I have seen no specimen.

Var. 7, *extensum*; stout or slender, sheaths glabrous or hirsute, spikes few or

many, rachis narrowly winged, spikelets oblong-lanceolate acuminate more or less ciliate, gl. I half the length of III or less or minute ciliate. Pan. extensum, *Nees & Arn. in Wight Cat.* n. 2340 (which is Pan. dilatatum, *Steud. l. c.* 39). Pan. nervosum, *Rottler in Ges. Naturf. Fr. Neue Schrift.* iv. (1803), 194 (*not Roxb*). P. filiforme, *Herb. Roxb.*—Common. This resembles a slender form of var. *commutatum*, with reduced gl. I.

Var. 8, *debile*; small or dwarf, 4–10 in. high, much branched from the tufted or prostrate or creeping base, glabrous or hairy, spikes 2–5 1–3 in. digitate or nearly so slender, wings of rachis narrower than the midrib, spikelets lanceolate acuminate, gl. I. from minute to nearly as long as III ciliate, II 5-nerved glabrous or ciliate. Pasp. debile, *Poir. Encycl.* v. 34 (*excl. syn.*); *Roem. & Sch. Syst.* ii. 303. Pan. debile, *Desf. Fl. Atlant.* i. 59; *Bertol. Fl. Ital.* ii. 778; *Trin. Panic. Gen.* 117. Digitaria debilis, *Willd. Enum. Hort. Berol.* i. 91; *Parlat. Fl. Ital.* i. 127.—Plains and low hills, from Bengal to Burma, Malacca, and the Andaman and Nicobar Islds. Ceylon (C.P. n. 856, 857).—*Wall. Cat.* 8683 (spikes longer, more slender). A very common dwarf form in low ground or poor soil, passing into var. *commutatum*, and the following. The specimens with gl. I nearly as long as III are typical *Pan. debile* of the Mediteranean region, but there is a gradual shortening of that gl. to a mere fimbriate scale. A minute accessory gl. at base of gl. II is present or absent. The Nicobar specimens have the bearded upper spikelet of var. *ciliare*.

Var. 9, *Rottleri*, characters of var. *debile*, but rachis of spike stouter broader green, the wings two or three times broader than the midrib, glumes broader as in *commutatum*, of which it is a dwarf form.—It resembles Host's and Reichenbach's figures of *ciliare*. Pan. Rottleri ? and P. ciliare, *Wight Herb.* n. 3032 (*not Cat.* 1610), and 3033.—Common in the plains of India.

7. **P. heteranthum,** *Hook. f.*; stem stout, spikes many 6–12 in., rachis very stout rigid trigonous, spikelets $\frac{1}{5}$ in. very distant, upper long-pedicelled lanceolate, gls. rigid finely acuminate, I and II longer than III, of lower spikelet glabrous of upper villous. Panicum barbatum, *Kunth Revis. Gram.* i. 33; *Enum. Pl.* i. 84; *Steud. Syn. Gram.* 43. *Benth. Fl. Hongk.* 410. Pan. elytroblepharum, *Steud. in Zoll. Syst. Verz.* 54. Pan. eminens, *Steud. l. c.* 43. Pan. heteranthum, *Nees et Meyen in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843), 174; *Steud. l. c.* 43. Digitaria barbata, *Willd. Enum. Hort. Berol.* 91. D. elytroblephara, *Miq. Fl. Ind. Bat.* iii. 439.

Malay Peninsula; Pahang, *Ridley.*—Distrib. Java, China.

A very remarkable species, of which I have seen only one Malayan specimen. The *spikes* appear to be irregularly produced, being leafy where their bases meet; rachis strict or flexuous, margined with green. *Lower spikelet* of each pair with very strongly nerved, acuminate, glabrous gls., and no small basal gl., upper with a rigid pedicel and minute, orbicular, naked, basal gl., its other gls. densely villous; gls. of the upper spikelet at length spreading, hairs very long, with hooked tips.—Perhaps only an extreme form of *P. saguinale*, var. *ciliare*. I have seen no authentic specimen of *P. elytroblepharum*, but Miquel's description of it accords with the Malayan plant, and he cites *P. eminens* as a synonym.

8. **P. pennatum,** *Hook. f.*; spikes 8–10 radiating elongate filiform ciliate, spikelets $\frac{1}{8}$–$\frac{1}{7}$ in. solitary or binate narrowly lanceolate subsilky, gl. I as long as III 3–5-nerved, II with or without a minute basal one nerves, 5 equidistant, III narrowly elliptic-lanceolate acuminate. Panicum pennatum, *Hochst. in Flora*, xxxviii. (1854), 197.

Sind; at Kurrachee, *Stocks.* Beluchistan, *Frere.*—Distrib. Arab., Abyssin.

Stem 1–2 ft., branching from the suberect or prostrate base, slender. *Leaves* 1–6 by $\frac{1}{6}$ in., glabrous, or sheaths and sometimes margins and both surfaces hairy, ciliate with long hairs towards the base; ligule rather long, membranous. *Spike* 3–6 in.; rachis almost capillary, trigonous, very rarely branched, cilia very long. *Spikelets* erect, pedicel of the upper almost as long as the gls.

9. **P. ambiguum,** *DC. Fl. Franc.* iii. 16; stems diffusely decumbent or ascending, spikes 2–4 subdigitate spreading, rachis narrowly winged, pedicels nearly glabrous, spikelets imbricate $\frac{1}{12}$ in. elliptic subacute silkily pubescent with slender hairs or glabrate, gl. I nearly = III, II 5-nerved, III ovate-oblong acute. Panicum ambiguum, *Lapeyr. Hist. Abr. Pl. Pyr.* 31; *Fig. & Not. in Act. Tor.* (1854) 336, t. 11; *Sang. in Atti Linc. Ser.* I. xviii. (1865) 219, t. 421. Pan. arenarium, *Bieb. Fl. Taur. Cauc.* i. 52. Pan. distichum, *Gaudin ex Steud. Nom. Ed.* II, ii. 255. Pan. glabrum, *Gaudin. Agrost. Helvet.* i. 22; *Fl. Helvet.* i. 155; *Trin. Diss.* ii. 83; *Sp. Gram. Ic.* t. 149; *Kunth Enum. Pl.* i. 83; *Boiss. Fl. Orient.* v. 433; *Steud. Syn. Gram.* 41. Pan. humifusum, *Kunth Revis. Gram.* i. 33. Pan. Ischæmum, *Schreb. ex Schweigg. Spec. Fl. Erlang.* 16. Pan. lineare, *Krock Fl. Siles.* i. 95. Pan. sanguinale, *Pollich. Hist. Pl. Palat.* i. 57. Digitaria filiformis, *Koel. Descr. Gram.* 26; *Reichb. Ic. Fl. Germ.* t. 27. D. glabra, *Beauv. Agrost.* 160; *Ledeb. Fl. Ross.* iv. 468; *Parlat. Fl. Ital.* i. 127. D. humifusa, *Pers. Syn.* i. 85; *Engl. Bot.* t. 2613. D. linearis, *Rostaf. in Verh. Bot. Zool. Ges. Wien.* xxii. (1872) 99. D. procumbens, *Hort. ex Steud. Nom. Ed.* II, i. 508. Syntherisma glabrum, *Schrad. Fl. Germ.* i. 163.

Western Himalaya, alt. 5–10,000 ft.; Kashmir, *Stewart*; Simla, *Thomson.* Western Tibet, alt. 8–10,000 ft., *Thomson.*—Distrib. Europe, N. Asia.

Stems 6–12 in., usually diffusely spreading, rarely erect. *Leaves* linear-lanceolate, acute, glabrous; mouth of sheath hairy. *Spikes* 2–6, 1–2 in. long, suberect or divaricate, green or reddish. *Spikelets* variable in hairiness; the hairs often with slightly clavate tips; gl. II with rarely a minute one at the base; III quite smooth.—Very similar to var. *cruciatum* of *P. sanguinale*, but has smaller broader not acuminate spikelets, and gl. IV is never acuminate. Even more like *P. ternatum*, which is best distinguished by the bristle-like hairs on the pedicel, and short clavate ones on the outer gls.

10. **P. ternatum,** *Hook. f.*; stems erect or decumbent below, spikes 2–3 subdigitate erect or spreading, rachis narrowly winged ciliolate, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. geminate imbricate elliptic subacute villous with clavellate hairs, pedicels setulose, gl. I nearly = III or shorter, II 5-nerved nerves equidistant, III ovate-oblong acute. P. humifusum, *Heyne ex Wall. Cat.* n. 8755. Panicum ternatum, *Hochst. in Flora*, xxiv. (1841) i. *Intell.* 19; *Steud. Syn. Gram.* 40. Cynodon ternatum, *A. Rich. Tent. Fl. Abyss.* ii. 405.

Western Ghats; Bababudan Hills, *Heyne*; Belgaum, *Ritchie.* Khasia Hills; Pomrang, alt. 4–5000 ft., *J. D. H. & T. T.*—Distrib. Abyssinia.

Habit of *P. ambiguum*. *Leaves* 2–5 in., linear-lanceolate or linear; sheath glabrous or with a few hairs, mouth ciliate; ligule short, membranous, truncate. *Spikes* 2–3 in., silvery-white. *Spikelets* pale, pedicels short, hispid with stiff hairs, the upper hairs half as long as the spikelet; gl. I and II with the hairs forming a dense fringe along the margins.—The Belgaum and Khasian specimens are tall and long leaved; the Bababudan ones very short. Said by Schimper to be a pest in cultivated land in Abyssinia. It so closely resembles *P. ambiguum*, that without microscopical examination of the hairs of the spikelets it is very difficult to distinguish it from that species. A Ceylon plant, from Thwaites (C.P. 2573), with larger spikelets than *P. longiflorum* (to which I doubtfully refer it), cannot be distinguished from *P. ternatum* except by the structure of the hairs of the spikelet.

†† *Spikelets* $\frac{1}{24}$–$\frac{1}{16}$ in., *with no minute gl. at base of* II.

11. **P. longiflorum,** *Retz. Obs.* iv. 15 (*non Trin.*); stems procumbent below rarely erect from the base, spikes 2– many subterminal erect or

spreading, rachis filiform, spikelets $\frac{1}{18}$–$\frac{1}{14}$ in elliptic-oblong silky with slender (not clavellate) crisped hairs, pedicels glabrous or nearly so, gl. I and II subequal or I shorter or obsolete, II 5-nerved, III ovate acuminate. *Wall. Cat.* n. 8751, C.; *Wight Cat.* n. 1603; *Baker Fl. Maurit.* 431. P. bifarium, *Edgew. in Journ. As. Soc. Beng.* xxi. (1853) 157 *nomen.* (*ex Thw. Enum. Pl. Zeyl.* 358). P. brevifolium, *Fluegge Gram. Monog.* 150 (*excl. Syn.*); *Kunth Enum. Pl.* i. 48; *Wight Cat.* n. 1603, 1604; *Steud. Syn. Gram.* 41; *Benth. Fl. Hongk.* 408, *Fl. Austral.* vii. 461; *Franch. & Sav. En. Pl. Jap.* ii. 159. P. chinense, *Nees in Hook. & Arn. Bot. Beech. Voy.* 231; *Steud. l. c.* P. filiculme, *Nees ex Thw. l. c.*; *Wight Cat.* n. 1604; *Trim. Cat. Ceyl. Pl.* 104; *Franch. & Sav. l. c.*; *Duthie Grass. N.W. Ind.* 1. P. granulare, *Trin. in Spreng. N. Entdeck.* ii. 47; *Kunth l. c.* 50. P. minutiflorum, *Steud. l. c.* 17; *Benth. l. c.* P. nematodes, *Schult. Mant.* ii. 71; *Kunth l. c.* 65. Panicum argyrotrichum, *Anderss. in Peters Reise Mossamb. Bot.* 548. Pan. lineare, β Pseudo Duroa, *Nees in Herb. Wight.* Pan. longiflorum, *Gmel. Syst.* 158; *Wall. Cat.* n. 8751 A. Pan. parvulum, *Trin. Pan. Gen.* 117, *in Mem. Acad. Petersb. Ser.* vi. iii. II (1835) 305. Pan. propinquum, *Br. Prodr.* 193. Pan. Pseudo-Duroa, *Nees Fl. Afr. Austr.* 21; *Wight Cat.* n. 1608. Pan. tenuiflorum, *Br. l. c.*; *Kunth l. c.* 85; *Duthie Grass. N.W. Ind.* 7, *Fodd. Grass. N. Ind.* 13. Digitaria linearis, *Schult. Mant.* ii. 264 (*ex Miquel*). D. longiflora, *Pers. Syn.* i. 85. D. Pseudo-Duroa, *Miq. Fl. Ind. Bat.* iii. 439. D. Roxburghii, *Spreng. Syst.* i. 270. D. tenuiflora, *Beauv. Agrost.* 51. Milium filiforme, *Roxb. Fl. Ind.* i. 314; *Wight Cat.* n. 1604, a.b.c. M. radiatum, *Herb. Rottl.* M. setaceum, *Herb. Koen. in Mus. Brit.* M. triracemosum, *Roxb. Ic. Ined.* n. 315. Agrostis lenta, *Ait. Hort. Kew*, i. 96. A. triracemosa, *Herb. Roxb.*—Paspalum, *Wall. Cat.* n. 8751, 8752 B.D.E.

Throughout INDIA, from Kashmir eastwards and southwards to Ceylon (C.P. 860) and Malacca; ascending the Himalaya to 6000 ft.—DISTRIB. Trop. and subtrop. regions of the Old World.

Annual or perennial? *Stems* tufted, 6–18 in., simple or branched below and rooting with ascending branches, or prostrate. *Leaves* very various, 1–1½ in. long lanceolate and divaricate, or 6–8 in. long, linear erect or spreading; sheath smooth or hairy; ligule short, truncate, membranous. *Spikes* 1–4 in., subdigitate or alternate, usually silvery-white. *Spikelets* geminate, a subsessile and pedicelled, pale green or purplish; gl. III pale, or dark brown.—The extreme forms of this species are very dissimilar, the most marked are *P. longiflorum*, proper (*brevifolium*, Fluegge), with often prostrate stems spreading from the root or creeping and rooting from 6–12 in. with short lanceolate leaves, and 2–3 divaricate spikes, and *P. minutiflorum*, Steud., with slender erect stems, narrow linear leaves and many long erect spikes, exactly as *P. Royleanum*. The hairs on the spikelets seen under the microscope are very slender and as it were crisped or wrinkled, quite unlike those of *P. ternatum* and *Royleanum*. Thwaite's CP. n. 2573 is a puzzling plant, tall, with much longer spikelets, approaching those of *P. ambiguum*. Though in this species and its allies there is no distinct gl. at the base of II, a microscopical rudiment of one may often (always?) be detected.

12. **P. Royleanum,** *Nees ex Thw. Enum. Pl. Zeyl.* 358; erect or shortly decumbent below, leaves usually erect, spikes 2–10 erect, rachis filiform, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. oblong, gl. I and II densely crisply white-tomentose with clavellate hairs, pedicel setulose, gl. I = $\frac{3}{4}$ III or shorter or obsolete, II broadly oblong subacute 5-nerved, III oblong subacute quite smooth. *Trim. Cat. Pl. Ceyl.* 158; *Herb. Strach. & Winterb. Pasp.* n. 2; *Duthie Grass. N.W. Ind.* 1. P. filiculme, *Herb. Strach. & Winterb.* n. 3

(*non Nees*). P. trachyanthum, *Nees in Herb. Wight.* Panicum puberulum, *Kunth Revis. Gram.* i. 32; *Enum. Pl.* i. 81; *Steud. Syn. Gram.* 41. Digitaria puberula, *Link Enum. Hort. Berol.* i. 223. Milium ovatum, *Heyne ex Wall. Cat.* n. 8752. Agrostis villosa, *Koen. in Herb. Mus. Brit.* Zoysia Codia, *Ham. in Wall. l. c.*—Paspalum, *Wall. l. c.* n. 8684, 8752, A.C.

Hilly districts of INDIA, from Kashmir eastwards to Munnipore, and southwards to Ceylon; ascending the Himalaya to 7000 ft.—DISTRIB. Africa trop.

Habit of the tall forms of *P. longiflorum*, almost always erect with long leaves, except in starved specimens; well distinguished from that plant (as Dr. Stapf first pointed out to me) by the short clavellate thick walled hairs of the spikelets, and the usually setulose pedicels, the longer hairs of which are sometimes half as long as the spikelet, as also by the shorter broader gl. III, which is (as in *longiflorum*) pale yellowish or dark brown and shining. *Gl.* I is often reduced to a tuft of hairs; II always = III.—This species was referred by Munro to *P. ischnocaulon*, Trin., a grass erroneously attributed to India, by its author in Sp. Gram. Ic. t. 126, but corrected to America in the corrigenda at the end of that work. Some specimens have been referred by Munro to *P. concinnum*, Steud. (Syn. Gram. 19), a very doubtful species of unknown origin. In the Ceylon specimen, C.P. 859, the pedicels are hardly setulose. In African specimens, apparently of this species, they are remarkably developed and longer than the spikelets. Specimens from Poona are tall, 2 ft. high, very robust, and branched from the base. Steudel's *P. Royleanum* is according to his description a very different plant, and judging by his reference of it to Wall. Cat. n. 8700 B. is *Panicum auritum*.

13. **P. pedicellare,** *Trin. ex Steud. Nom. Ed.* II, ii. 272; erect, spikes alternate approximate erect or spreading, spikelets $\frac{1}{20}$ in. geminate or 3–5-nate, upper of each pair half as long as their pedicels elliptic acute, gls. membranous, I and II subequal 5-nerved, III elliptic-oblong acuminate pale. P. granulare, *Trin. in Spreng. Neue Entdeck.* ii. 47; *Spreng. Syst.* i. 244; *Kunth Enum. Pl.* i. 50; *Steud. Syn. Gram.* 16. P. pedicellatum, *Nees & Arn. in Wight Cat.* 2310, *& Herb.* n. 3027; *Duthie Grass. N.W. Ind.* 1. Milium capillaceum, *Koen. ex Steud. Nom. Ed.* II, ii. 145. M. punctatum, *Koen. in Herb. Mus. Brit.* M. sanguinale, *Roxb. Fl. Ind.* i. 315 (*excl. Syn. Burm.*). M. setaceum, *Koen. in Herb. Banks.*; *Jacq. ex Trin. l. c.* M. striatum, *Herb. Ham. ex Wall. Cat.* n. 8747 A.—? Paspalum, No. 3, *Griff. Notul.* iii. 14 (*in part*), *Ic. Pl. Asiat.* t. 146, f. 1.—Panicum, *Wall. Cat.* n. 8747.

THROUGHOUT INDIA, in the plains and low hills from the N.W. Provinces to Bengal. NILGHIRI HILLS, alt. 5000 ft., *Beddome.* UPPER BURMA, *Collett.*

Stem 6–18 in., branched from the base. *Leaves* 2–6 by $\frac{1}{8}$–$\frac{1}{6}$ in., finely acuminate; ligule short, scarious. *Spikes* 3–10, 1–4 in., subterminal on the very slender peduncle, spreading; rachis capillary, trigonous; pedicels $\frac{1}{24}$–$\frac{1}{8}$ in.; gls. slightly hairy.—Munro identifies Griffiths' *Pasp.* 3 with this; it differs in the flattened rachis, red prostrate stem, and pale red spikelets, which I have never seen in *pedicellatum*. Roxburgh's excellent drawing (as *Milium sanguinale*) shows pale spikelets.

14. **P. jubatum,** *Griseb. in Goett. Nachr.* (1868) 84 (*Gesamm. Abhandl.* 301); erect, rather stout, leaves long, spikes very many lower whorled, spikelets $\frac{1}{20}$ in. in scattered pairs pale or dark purple elliptic acute, gls. finely tomentose, I rather shorter than III 3-nerved, II 5-nerved, III elliptic-lanceolate acuminate.

The KHASIA HILLS; in wet places, alt. 5 6000 ft, *J. D. H. & T. T.*, &c.

Stem 2–4 ft., shining, internodes long. *Leaves* 6–10 by $\frac{1}{6}$–$\frac{1}{4}$ in., smooth; sheath very long; ligule short rounded. *Spikes* 4–7 in., very unequal; rachis slender,

trigonous. *Spikelets* subsessile; gls. thin, shining.—Pale spikes and spikelets occur on the same plant with the dark coloured.

15. **P. Perrottetii,** *Hook. f.*; stem creeping below, spikes in a pyramidal panicle lower often whorled, rachis capillary, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. oblong-lanceolate acute brown, upper of each pair long-pedicelled, gl. I and II subequal many-nerved, III elliptic-lanceolate acuminate. Panicum Wallichianum, *Wight & Arn. in Wight Cat.* n. 1607, *Herb.* 3085; *Steud. Syn. Gram.* 41; *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104. Pan. multibrachiatum, *Hochst. ex Steud. l. c.* 74. Pan. Perrottetii, *Kunth Revis. Gram.* ii. 395, t. 3; *Enum. Pl.* i. 96. Milium minutiflorum, *Trin. Panic. Gen.* 33.

Nilghiri Hills, *Wight*, &c., alt. 6000 ft., *Lawson.* Ceylon, in the Central Province, *Thwaites.*—Distrib. N. Africa.

Very variable in height, 6–24 in., much branched below. *Leaves* 1–6 by $\frac{1}{6}$–$\frac{1}{4}$ in., glabrous or ciliate; sheaths 1–1½ in.; ligule rounded, scarious. *Panicle* 2–3 in., peduncle filiform. *Spikes* erecto-patent, lowest ½–¾ in., upper gradually smaller; rachis trigonous. *Spikelets* geminate, lower sessile or pedicelled.—The panicled inflorescence is very different from that of *P. pedicellare.*

DOUBTFUL SPECIES.

P. Griffithianum, *C. Mull. in Bot. Zeit.* xxix. (1861) 325. "Foot of Khasia Hills, *Griffith.*"—There is no Indian *Paspalum* that at all resembles the description of this, which, according to its author, is an ally of *P. fluitans*, Ell., and other American species. There is probably an error as to the habitat and collector.

2. ERIOCHLOA, *H. B. & K.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* secund on the spiciform branches of a raceme or panicle, base thickened and articulate on the thickened top of the short pedicel. *Glumes* 3, I and II subequal, membranous; III shorter, apiculate, hardened in fruit. *Lodicules* truncate. *Stamens* 3, anthers linear. *Styles* free. *Grain* oblong, free within the hardened glume.—Species few, tropical.

The thickened base of the spikelet alone distinguishes *Eriochloa* from *Paspalum.*

1. **E. polystachya,** *H. B. & K. Nov. Gen. & Sp.* i. 95, f. 31; spikes panicled, spikelets ⅛ in. long erect ovoid acute, gl. I & II silky or glabrous 3–5-nerved. *Lam. Encycl.* t. 909; *Kunth Enum. Pl.* i. 72, *Suppl.* 53; *Trim. Cat. Ceyl. Pl.* 104; *Duthie, Indig. Fodd. Grass.* t. 41, *Fodd. Grass. N. Ind.* 2. E. annulata, *Kunth Rev. Gram.* i. 30, *Enum.* i. 73; *Aitchis. Cat. Panjab. Pl.* 158; *Duthie Grass. N.W. Ind.* 2; *Benth. Fl. Hongk.* 409, *Fl. Austral.* vii. 463. E. punctata, *Ham. Prodr. Fl. Ind. Occ.* 5; *Kunth Enum.* i. 72, *Suppl.* 54. *Miq. Fl. Ind. Bat.* iii. 441; *Benth. Fl. Austral.* vii. 462. E. sundaica, *Miq. l. c. Suppl.* 606. E. succincta, *Kunth l. c.* i. 73. Helopus annulatus, *Nees in Mart. Fl. Bras.* ii. 17; *Wight Cat.* n. 1605; *Wall. Cat.* n. 8750. H. lævis, *Trin. ex Spreng. Neue Entdeck.* ii. 49, fig. 4. H. pilosus, *Trin. Fund. Agrost.* 104, fig. 4. H. acrotrichus, *Steud. Syn. Gram.* 100. Paspalum punctatum, *Fluegge l. c.* 127 (Paspalus); *Trin. Sp. Gram. Ic.* t. 155. P. annulatum, *Fluegge l. c.* 133 (Paspalus); *Trin. l. c.* t. 133. P. succinctum, *Trin. Diss.* ii. 19; *Sp. Gram. Ic.* t. 156. Milium Carar & M. Languchinia, *Herb. Ham. ex Wall. Cat.* n. 8750, F G. M. polystachyum, *Spreng. Syst.* i. 251. M. punctatum, *Linn. Amœn. Acad.* v. 392, *Sp. Pl.* 91; *Br. Prodr.* 188. M.

orixense, *Roxb. Ic. ined.* n. 818. M. ramosum, *Retz. Obs.* vi. 22; *Roxb. Fl. Ind.* i. 316; *Griff. Notul.* iii. 15, *Ic. Pl. Asiat.* t. 139, f. 60. Piptatherum punctatum, *Beauv. Agrost.* 18, t. 5, f. 1. P. confine, *Schult. Mant.* ii. 184 (*ex Kunth*). P. annulatum, *Raddi Agrost. Bras.* 30. Agrostis punctata, *Lamk. Encycl.* i. 58. Œdipachne punctata, *Link Enum. Hort. Berol.* i. 51.

PLAINS OF INDIA; from the Punjab to Bengal, Burma, Central India, and southward to Malacca and CEYLON.—DISTRIB. All hot countries.

Stems 1–5 ft., ascending from a creeping base. *Leaves* 3–10 by $\frac{1}{6}$–$\frac{1}{3}$ in., glabrous or hairy, ligule very short. *Spikes* forming a narrow secund compound panicle 2–6 in. long; rachis trigonous and branches pubescent villous or nearly glabrous. *Spikelets* shortly pedicelled; gl. I and II usually silky, sometimes villous, III much shortest, punctulate, very shortly awned.

3. ISACHNE, *Br.*

Perennial grasses. *Spikelets* small or minute, loosely panicled, not or obscurely articulate with the pedicel, subglobose or obovoid, 1–2-fld. *Glumes* 4, often all separately deciduous from a minute rachilla; I and II subequal, convex, herbaceous, empty; III and IV paleate, equal and both convex, or III larger flatter thinner; III male, rarely 2-sexual; IV articulate and often stipitate on the rachilla, hemispheric, coriaceous, fem. or bisexual. *Lodicules* very minute. *Stamens* 3, rarely 4–6. *Grain* free within the hardened gl. and pale.—Species about 25, tropical and subtropical.

The 2-fld. spikelets not articulate on the pedicel, with usually subequal convex empty gls., and gl. IV being articulate on the rachilla, distinguish *Isachne* from *Panicum*. I find great varieties in the persistence of the empty glume on the pedicel. Mr. Rendle informs me that he has seen traces of a fifth glume and palea in *I. australis*, which favours the claim of the genus to be referred to *Poaceæ*; and he has shown me a most minute prolongation of the rachilla at the base of the palea of gl. IV in the same species. Many of the species so run into their allies, that I regard the following limitation of most as open to question. The smooth hispid or bristly empty gls. affords no specific character, nor does the glabrous or pubescent fl. gl.

* Spikelets $\frac{1}{20}$–$\frac{1}{10}$ in long.

† Glumes I and II longer than IV, cuspidate or acuminate.

1. **I. Kunthiana,** *Wight & Arn. in Wight Cat.* n. 1659; *Thw. Enum. Pl. Zeyl.* 362; stem 6–10 in. more or less hairy, leaves ovate or ovate-oblong, panicle 2–2½ in., branches few, gl. I and II subacute or subcuspidate 7–9-nerved. *Miq. Fl. Ind. Bat.* iii. 460; *Trim. Cat. Ceyl. Pl.* 104. I. dispar, *Herb. Wight.* I. Metzii, *Hochst. in Hohen. Pl. Ind. Or.* n. 1276. I. Neesiana, *Arn. ex Steud. Syn Gram.* 96. Panicum cuspidiglume, *Steud.* Kunthianum, *Wight & Arn.* & Metzii, *Hochst. ex Steud. l. c.* 96, 95. P. obliquum, *Moritz. ex Miq. l. c., Steud. l. c.* P. Burmanni, et P. marginatum, var. *Heyne ex Wall. Cat.* n. 8734, A.

NILGHIRI and TRAVANCORE HILLS, alt. 6–8000 ft., *Heyne,* &c. SINGAPORE, *Ridley.* CEYLON; in elevated districts.—DISTRIB. Java, Borneo.

Stem ascending, geniculate, branched. *Leaves* ½–2½ in., striate, spreading, smooth or scaberulous above, base cordate, midrib and nerves obscure; ligule of hairs. *Panicle* 2–2½ in.; branches short, rather stout, at length horizontal, pubescent or glabrous. *Spikelets* $\frac{1}{20}$–$\frac{1}{16}$ in., very shortly pedicelled; gl. I and II smooth

hispid or bristly; III and IV subequal or III rather the largest, glabrous or puberulous.—*I. Neesiana*, is rather more glabrous, and has rather more unequal gls. III and IV, but these characters are too variable to found a distinct variety upon.

Var. *latifolia*; stem 12–16 in. stouter, leaves 2–3 by $\frac{1}{2}$–$\frac{3}{4}$ in. and sheaths sparsely hairy, midrib and 2–3 pairs of principal nerves distinct.—Nilghiri Hills, alt. 6000 ft., *Lawson;* Anamallay Hills, *Beddome.*—Almost intermediate between *I. Kunthiana* and *elatior.*

2. **I. elatior,** *Hook. f.*; nearly glabrous, stem 2–4 ft., nodes tomentose, leaves 3–4 in. ovate-lanceolate acuminate thin scabrid above, panicle 5–7 in., branches many slender, gl. I and II subcuspidate 5–9-nerved.

Ceylon, *Gardner*; Newera Ellia, *Thwaites* (CP. 314).

Included by Thwaites under *I. Kunthiana*, possibly correctly, but a very different looking plant, from its great size, thin leaves and much larger many-fld. panicle, with longer branches.

3. **I. Lisboæ,** *Hook. f.*; glabrous, stem creeping, branches ascending, leaves thin oblong-lanceolate, panicle with few horizontal stout hispidly setulose branches, gl. I and II 5-nerved hispid, III and IV equal.

The Concan; Mahableshwar, *Lisboa.*

Stem creeping for several inches with long wiry roots, then ascending, and 6 in. high, rather stout. *Leaves* 1–2 in. by $\frac{2}{3}$ in., recurved, thin, acute or obtuse, finely striate; base rounded, margins ciliate; sheaths loose; ligule 0. *Panicle* with the rachis quite smooth. *Spikelets* $\frac{1}{10}$ in. diam., secund on the lower surface of the branches, sessile or shortly pedicelled; gl. I and II hemispheric, 5-ribbed, tip obtusely cuspidate, a little larger than III which is glabrous.—I have seen but one specimen of this species, which probably varies like its congeners in the smoothness or hispidity of the spikelets. The 5-ribs of gl. I and II are good characters.

†† Glumes I and II much shorter than IV.

4. **I. multiflora,** *Trim. Cat. Ceyl. Pl.* 104. I. australis, *var.* multiflora, *Thw. Enum. Pl. Zeyl.* 361.

Ceylon; Oova district, alt. 5000 ft., *Thwaites.*

Stem 1–2 ft. or more, branched, and sheaths smooth. *Leaves* 4–6 by $\frac{1}{4}$–$\frac{1}{3}$ in., smooth, deeply striate, margins hardly thickened, nerves obscure. *Panicle* 4–7 in.; branches many, long, suberect, and very short pedicels subcapillary. *Spikelets* $\frac{1}{20}$ in., glabrous, glistening, purplish; gl. I oblong-ovate, 7-nerved; II as long, glabrous; III oblong-lanceolate, empty; IV much shorter, broadly oblong, obtuse, glabrous.

††† Glumes I and II about equalling IV.

§ *Glumes III and IV usually equal and similar, both hemispheric and coriaceous.*

5. **I. albens,** *Trin. Sp. Gram. Ic.* t. 25; tall, erect, leaves and sheaths smooth, panicle large pyramidal effuse, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. rather shortly pedicelled, globose. *Kunth Enum. Pl.* i. 137; *Miq. Fl. Ind. Bat.* iii. 459. *Duthie Grass. N. W. Ind* 2 (*excl. Syn.*), *Fodd. Grass. N. Ind.* 3. Panicum albens, saxatile & Zollingeri, *Steud. Syn. Gram.* 96, 97.—Isachne, *Wall. Cat.* n. 8658.

Temperate and subtropical Himalaya and the Khasia Hills, alt. 2–6000 ft. from Simla eastward; ascending to 9000 ft. in Sikkim. Burma, *Griffith.* Perak, alt. 4600 ft. *Wray.*—Distrib. China, Malaya.

Stem 1–4 ft., branched. *Leaves* 2–8 in., very variable ($\frac{1}{3}$–1 in.) in width, linear

or linear-lanceolate, glabrous or sparsely hairy beneath; margins thickened scaberulous; midrib and 3–5 pairs of principal nerves distinct, mouth of sheath ciliate. *Panicle* 3–14 in. long, branches and pedicels capillary; gl. I and II obtuse glabrous or sparsely setulose, usually pale green, faintly many-nerved; III and IV glabrous or pubescent, both often bisexual.

Var. *hirsuta*; leaves broad, sheaths hirsute.—Isachne, *Wall. Cat.* n. 8657.—Silhet, *de Silva.* Cachar, *Keenan.*

6. **I. scabrosa**, *Hook. f.*; leaves suberect, sheaths scabrid, panicle 2–3 in. pyramidal, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in.

Khasia Hills, alt. 4500–5000 ft. *Clarke.*

Stem rambling below, then suberect, 1–3 ft., stiff, sparingly branched. *Leaves* 3–6 by $\frac{1}{3}$–$\frac{1}{2}$ in., linear-lanceolate, scabrid on both surfaces, pale and strongly-nerved beneath, margin thickened; mouth of sheath sparingly ciliate. *Panicle* very shortly peduncled; branches erecto-patent, 1–1½ in. long; pedicels capillary, smooth, tips not swollen. *Spikelets* sparsely setulose, tips rounded; gl. I and II glabrous or sparsely setose, many-nerved.—Easily distinguished from *P. albens* and *himalaica* by the scabrid leaf-sheaths; but most nearly allied to the latter.

7. **I. himalaica**, *Hook. f.*; erect, leaves linear or linear-lanceolate strict scaberulous above, margins slightly thickened, sheaths smooth, panicle pyramidal, spikelets $\frac{1}{16}$–$\frac{1}{14}$ in. globose, pedicels long capillary tips hardly thickened, gl. I and II faintly many-nerved. I. australis, *Aitchis. Cat. Punjab. Pl.* 761; *Herb. Ind. Or. Hf. & T.* (the Khasian plant); *Duthie Grass. N.W Ind.* 2, *Fodd. Grass N. Ind.* 3. I. muricata, *Munro in Herb. Strach. & Winterb.* No. 2. ?Panicum montanum, *Duthie Grass. N.W. Ind.* 4.—Isachne, *Wall. Cat.* n. 8656, D E.

Western temperate and subtropical Himalaya; in wet places, ascending to 6000 ft.; Kumaon, *Strach. & Winterb.* Nepal, *Wallich.* Peshawur, *Aitchison.* Rajaori, *Jacquemont.* Khasia Hills, in marshes, alt. 4–5000 ft. common. —Distrib. Affghanistan.

Stem 1–2 ft., erect from the base, stout or slender, stiff. *Leaves* always narrow ($\frac{1}{6}$-$\frac{1}{3}$ in.), nearly ensiform; nerves 9–11 pair, usually very strong, margins thickened; mouth of sheath stiffly ciliate. *Panicle* with erecto-patent branches 1–1½ in. long. *Spikelets* green or purplish; gl. I and II glabrous scabrous or bristly, III sometimes longer and flatter than IV.—Very like *I. australis*, but a larger and more rigid plant, with gl. II and III usually equal, and both hemispheric.

In a note in Munro's herbarium this is referred to the Javan *I. virgata*, Nees (Miq. Fl. Ind. Bat. iii. 462 = *Panicum rhabdinum*, Steud.), but that is described as being fastigiate spikelets, and glumes with narrowed obtuse mucronate points. It closely resembles a Sumatran plant from Beccari (n. 198).

8. **I. elegans**, *Dalzell mss.*; erect, tufted, flaccid, glabrous or nearly so, leaves 2–5 in. very narrowly linear acute soft smooth on both surfaces or scaberulous above, margins thickened, panicle subsessile contracted, branches erect, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. pedicels short, tips rounded, gl. I and II many-nerved.

The Concan, *Dalzell, Stocks*, in wet places between Poonah and Carli, *Jacquemont* (n. 143), *Woodrow* (n. 175).

Stems 8–12 in., densely tufted, soft. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in. broad, principal nerves 0 or 1–2 on each side, margins thickened, smooth or serrulate, rarely with a few scattered bristles beneath; sheath quite smooth, mouth ciliate. *Panicle* 3–5 in., glabrous; branches ½–1 in., smooth; pedicels rarely longer than the spikelets, which are hispid green or blueish, gls. III and IV pubescent, usually equal and both hemispheric, but III sometimes longer and flatter.—The tufted flaccid habit is quite unlike *I. australis*, but may be due to local conditions.

9. **I. javana,** *Nees ex Miq. Pl. Jungh.* 376, & *Fl. Ind. Bat.* iii. 462; stout, erect, leaves 2–3 in. acute or obtuse stiff glaucous beneath, margins much thickened, panicle lax, branches and pedicels very long and slender tips obconic, spikelets obovoid $\frac{1}{14}$–$\frac{1}{12}$ in. long. Panicum batavicum, *Steud. Syn. Gram.* 96.

Upper Burma, *Herb. Hort. Calcutt.* Malacca, *Maingay*; Mt. Ophir, *T. Lobb, Hullett.* Perak; on Gunong Bubu, alt. 5000 ft. *Wray.*—Distrib. Java, Borneo.

Habit of *I. himalaica.* *Stem* 2–3 ft., quite smooth, stiff; nodes ciliolate. *Leaves* erect or erecto-patent, strict, nearly smooth on both surfaces, or sparsely hairy beneath, with 9–11 pairs of often very obscure nerves, margin smooth or serrulate; sheaths quite smooth, margins glabrous or ciliate, mouth bearded. *Panicle* 2–4 in., glabrous, lower branches 2–3 in.; pedicels more thickened at the tip than in most other species. *Spikelets* broad, smooth; gl. I and II often polished; nerves many, obscure; III and IV usually equal and both hemispheric; III rarely larger and flattened, usually male; IV fem. or bisexual; sometimes both III. and IV. are triandrous or hexandrous, in one spikelet III was triandrous and IV tetrandrous. —A much larger plant than *I. australis.*

10. **I. Clarkei,** *Hook. f.*; stem short very slender, leaves 1–2 in. ovate-lanceolate acute very thin, margins thickened serrulate, panicle 2–3 in. pyramidal, branches horizontal and pedicels capillary tips slightly thickened, spikelets $\frac{1}{30}$–$\frac{1}{20}$ in.

Sikkim Himalaya; meadows in the Lachoong valley, alt. 8–11,000 ft.—*J. D. H.* Munnipore; on Kohima, alt. 5800 ft. *Clarke.*

Stems 6–12 in., almost filiform, base prostrate. *Leaves* spreading, almost membranous, nerves many faint, midrib obscure; sheath and its mouth often strongly ciliate. *Panicle* long-peduncled, branches 1 in. and less. *Spikelets* scattered, hispid, green or purplish; gl. IV. hispidly pubescent —Apparently a distinct little species with very small spikelets, but possibly a small state of *I. albens.*

11. **I. rigida,** *Nees ex Steud. Syn. Gram.* 95; stems rigid much branched from the base, leaves $\frac{1}{2}$–1 in. rigid spreading and recurved ovate to ovate-lanceolate almost pungent scabrid base cordate margins thickened, panicle small pyramidal glandular, spikelets few $\frac{1}{20}$ in., pedicels long slender tip subclavate. *Miq. Fl. Ind. Bat.* iii. 461. I. Myosotis, *Benth. Fl. Hongk.* 415 (*not of Nees*). Panicum rhignon, *Steud. l. c.* P. piluliferum, *Nees ex Steud. l. c.* 24 (*fide Herb. Munro*).

Tenasserim, *Helfer.* Nicobar Islds., *Kurz.*—Distrib. Java, Borneo, China.

Stems 6–16 in., generally very long decumbent and naked below, internodes 1–1½ in., naked. *Leaves* deeply striate, with finely acuminate acicular tips, margins smooth ciliolate or serrulate; sheaths $\frac{1}{4}$ in., smooth scabrid or bristly. *Panicle* 1 in., peduncle stout; branches horizontal. *Spikelets* few, hispid; gl. I and II many-nerved, III and IV glabrous.—I take this to be the Javan *I. rigida*, Nees, from Steudel's description. It further agrees well enough with the descriptions of *I. firmula* and *I. monticola*, Buese.

§§ *Glume III usually flatter and thinner, and often longer than IV.*

12. **I. australis,** *Br. Prodr.* 196; stems tufted ascending, leaves short lanceolate or linear-lanceolate acute margins not or very slightly thickened, sheath smooth, panicle ovoid or pyramidal, spikelets globose $\frac{1}{14}$–$\frac{1}{12}$ in. glabrous or setose, tips of pedicels hardly thickened. *Kunth Enum. Pl.* i. 136; *Thw. Enum. Pl. Zeyl.* 361 (*in part, excl. Syn.*); *Trim. Cat. Ceyl. Pl.* 104; *Miquel Fl. Ind. Bat.* iii. 461; *Benth. Fl. Hongk.* 414, *Fl. Austral.* vii. 625; *Hook. f. Handb. N. Zeal. Fl.* 324; *Buchan. Grasses*

N. Zeald. t. 12; *Bailey Grasses Queensl.* t. 1; *Franch. & Sav. En. Pl. Jap.* ii. 164. I. atro-vivens, *Trin. Gram. Panic.* 251. I. lepidota, *Steud. in Flora*, xxix. (1846) 19; *Walp. Ann.* i. 924. Panicum antipodum, *Spreng. Syst.* i. 314; *Steud. Syn. Gram.* 94. P. atro-vivens, *Trin. ex Spreng. Neue Entdeck.* ii. 88, *Syst. Veg.* i. 318; *Kunth l. c.* 127. P. australis, *Rasp. in Ann. Sc. Nat.* v. (1825) 299. P. lepidotum, *Steud. in Flora*, xxix. (1846) 19. P. nodibarbatum, *Hochst. Pl. Hohenack.* n. 127; *Steud. l. c.* 95. P. violaceum, *Kleine ex Thiele in Linnæa*, ix. (1834) 307. Aira ischæmoides, *Koen. ex Kunth l. c.* 127. Milium globosum, *Thunb. Fl. Jap.* 49.—Isachne, *Wall. Cat.* n. 8656, A B C F.

Hotter parts of INDIA, from Assam and Burma to Central India and southward to CEYLON.—DISTRIB. Austral., N. Zeald.

Stem 8–18 in. from a creeping branching base; nodes glabrous or sparsely bearded. *Leaves* 1–3 in., rarely more, subscaberulous above or on both surfaces, margins ciliolate, nerves 0 or 2–3 very slender pairs, midrib obscure; sheaths smooth, mouth and often margins ciliate. *Panicle* 1–3 in., contracted and ovoid or pyramidal and open; branches glabrous or obscurely scaberulous, and as the pedicels very variable in length. *Spikelets* green or purplish, obtuse, smooth and polished or scabrid or setulose; gl. I and II faintly many-nerved; III and IV usually very unequal, III longer, flatter, thinner, shining; IV coriaceous, glabrous or pubescent, orbicular or broadly ellipsoid.—I. mauritiana, *Kunth*, is a very closely allied species, but has gl. III and IV equal and similar; it is *Panicum dubium* and *biflorum*, Lamk.

Var. *effusa*, Trim. Cat. Ceyl. Pl. 104; panicle pyramidal, branches longer, and pedicels spreading capillary, spikelets rather smaller.—Ceylon; Peradeniya, *Trimen.*

13. **I. miliacea,** *Roth Nov. Pl.* 58; stems very slender prostrate widely creeping and branched below then ascending, leaves small ovate-lanceolate acute margins not or faintly thickened, panicle small contracted or spreading lax-fld. spikelets $\frac{1}{20}$–$\frac{1}{16}$ in., pedicels short tips hardly thickened. *Kunth Enum. Pl.* i. 136; *Miq. Fl. Ind. Bat.* iii. 459 (*excl. some syns.*). I. Meneritana, *Poir. Encycl. Suppl.* iii. 185 (*excl. Syn.*); *Br. Prodr.* 196. I. minutula, *Kunth Revis. Gram.* ii. t. 117, *Enum. Pl.* i. 137, *Suppl.* 99. I. adstans, *Miq. l. c.* 461. I. polygonoides, *Doell in Mart. Fl. Bras.* ii. II 273. I. geniculata & stigmatosa, *Griff. Notul.* iii. 41, 42, *Ic. Pl. Asiat.* t. 139, f. 206, 148, f. 2. Panicum æquatum, *Nees ex Steud. l. c.* 98. P. adstans, *Steud. l. c.* 94. P. Benjamini, *Steud. l. c.* 96, *ex Miq. l. c.* 459. P. Meneritana, *Spreng. Syst.* i. 321. P. minutulum, *Gaud. in Freyc. Voy. Bot.* 410; *Steud. l. c.* P. polygonoides, *Lam. Encycl.* iv. 742; *Decne in Nouv. Ann. Mus. Par.* iii. 352. P. patens, *Roxb. Fl. Ind.* i. 305; *Kunth l. c.* 126; *Hohenack. Pl. Ind. Or.* n. 202. P. gonatodes, *Steud. l. c.* 95. Neurachne Meneritana, *Roem. & Sch. Syst.* ii. 475 (*excl. syn.*). Aira cœrulea, var. *Herb. Heyne.*—Isachne, *Wall. Cat.* n. 8655.

Low marshy ground, from the SIKKIM TERAI, BENGAL and SILHET to BURMA and southward to MALACCA, the NICOBAR ISLDS., and CEYLON.—DISTRIB. China, the Malay and Pacific Islds., S. America.

Very variable in size; stem rarely 6–8 in. high, nodes of stem glabrous or ciliate; sheaths glabrous or sparsely hairy. *Leaves* flaccid or rather stiff, usually spreading, nerveless or nearly so, glabrous or sparsely hairy on both surfaces. *Spikelets* as in *I. australis*, but usually smaller, glabrous, rarely sparsely setose; gl. I and II 5- or more-nerved; IV glabrous or pubescent.—The small states of this plant look very different from typical *I. australis*, but larger appear to unite them by many intermediates. Trimen refers *I. Meneritana* to *I. australis*, Mr. Rendle, who has carefully compared the types of each in the British Museum, agrees with me that it goes best with *miliacea*. He also informs me that Burman's Thes.

Zeyl. 110, t. 47, f. 3, is not an *Isachne*, but resembles an *Eragrostis*; and that Plukenet's Phyt. t. 300, f. 2. (in *Herb. Sloane*) is *E. ciliaris* from the Malabar Coast. Trimen has pointed out (*Journ. Bot.* xxxiii. (1885) 271) that the "Meneritana of the Cingalese is not an *Isachne*, but is applied to *Panicum miliare* and *psilopodium*.

14. **I. dispar,** *Trin. Sp. Gram. Ic.* t. 6; stem short ascending from a branched creeping base, leaves ½–1 in. ovate-cordate to lanceolate acuminate scaberulous margins thickened, panicle oblong at length pyramidal, spikelets $\frac{1}{14}$–$\frac{1}{12}$ in., pedicels short tips thickened. *Kunth Enum. Pl.* i. 136; *Duthie Grass. N.W. Ind.* 2; *Miq. Fl. Ind. Bat.* iii. 460. I. muricata, *Nees in Wight. Cat.* (*ex Miq. l. c.*). Panicum dispar, *Steud. Syn. Gram.* 96. ?P. muricatum, *Retz. Obs.* v. 18.

Nepal, *Wallich.* Sikkim Terai, *Clarke.* Rajpootana, on Mt. Aboo, *King, Duthie.* Nilghiri Hills, alt. 5000 ft. *Clarke.*

Stems 2–6 in. *Leaves* spreading, rather rigid, striated; midrib slender. *Spikelets* as in *I. australis*; pedicels smooth or rough; gl. I and II scabrid or setulose, nerves many, faint; III glabrous; IV pubescent.—This again is perhaps a var. of *I. australis*, of lower stature with more rigid scaberulous strongly margined leaves, sometimes ciliate at the base, and smaller panicles with shorter pedicels.

** Spikelets ⅛–¼ in. long.

15. **I. Walkeri,** *Wight & Arn. ex Thw. Enum. Pl. Zeyl.* 361; tall, slender, leaves linear-lanceolate acuminate margins thickened, panicle very lax branches and pedicels very long capillary, gls. I and II subequal 7–9-nerved. I. nilagirica, *Hochst. Pl. Hohenack.* n. 1280; *Trim. Cat. Ceyl. Pl.* 104. Panicum Walkeri, *Steud. Syn. Gram.* 97.

Nilghiri Hills; Khoondah Ghat, *Wight*; Conoor, alt. 6000 ft., *Clarke*, &c. Ceylon; forests of the Central Province, *Walker, Thwaites* (C.P. 282).

Stem 2–3 ft., as thick as a crow-quill, decumbent below. *Leaves* 4–6 by ⅛–½ in., rigid, smooth above, hairy beneath with a distinct midrib and 3–5 pairs of primary nerves, base narrow rounded; sheath smooth, margins above and mouth bearded. *Panicle* 8–12 in.; branches 1½–3 in., sparingly divided. *Spikelets* ⅙–⅕ in., few, very distant; gl. I and II persistent, oblong, obtuse; III and IV oblong, obtuse, glabrous.

16. **I. Gardneri,** *Benth.* in *Gen. Pl.* iii. 1100; tall, slender, leaves lanceolate acuminate margins hardly thickened, panicle very lax, branches and pedicels very long filiform, gl. I much shorter than II 3-nerved, II 5-nerved. I. nilagirica, *Trim. Cat. Pl. Ceyl.* 104 (*non Hochst.*). Panicum Gardneri, *Thw. Enum. Pl. Zeyl.* 359.

Nilghiri Hills; Madawattan, alt. 6000 ft., *Lawson.* Anamallay Hills, *Beddome.* Ceylon; Central Provinces, alt. 4–6000 ft., *Gardner, Thwaites*, &c.

Stem 2–3 ft., slender, quite smooth, decumbent below. *Leaves* 2–3 by ½–¾ in., thin, glabrous or sparsely hairy beneath, base broad cordate, principal nerves 3–4 pairs, very slender; mouth of sheath ciliate. *Panicle* with widely spreading sparingly divided branches; tip of pedicel thickened. *Spikelets* ⅕–¼ in., few, distant, oblong; gl. I and II obtuse glabrous or sparsely setose, I ovate; II ovate-oblong; III and IV elliptic-oblong, acute, quite smooth.

4. PANICUM, *Linn.*

Annual or perennial grasses. *Leaves* various. *Spikelets* small, 1-2-fld., terete or dorsally or laterally compressed, articulate on their pedicels, very rarely awned, never silkily villous; glumes 4, I and II empty, epaleate;

I smallest and fewest nerved; II. and III usually subequal, 3–∞-nerved oblong ovate or lanceolate; III paleate or not, triandrous or neuter; IV paleate, bisexual, oblong ovate or lanceolate, hardened in fruit, glabrous dorsally convex; palea 2-nerved, membranous or hardened in fruit. *Lodicules* 2, cuneate or quadrate, rarely 0. *Stamens* 3, apically exserted. *Grain* free within gl. IV and palea.—Species very many; all warm countries.

Exceptions. In *P. subeglume*, gl. I and II are absent. In *P. Crus-galli* gl. III is sometimes produced into a rigid long or short awn. In *P. notabile*, *ambiguum* and *javanicum*, gl. IV is crowned with a short awn that is concealed by gls. II and III.

Under *Pospalum* (p. 10), I have given my reasons for removing to that genus the group *Digitaria*, which has hitherto been referred to *Panicum*; those for excluding *Tricholæna* and *Axonopus* will appear under the respective genera. *Ichnanthus* is excluded on less satisfactory grounds.

KEY TO THE SECTIONS.

A. Spikelets terete or dorsally compressed.

I. *Branchlets of panicle not produced beyond the terminal spikelets into awn-like bristles.*

Sect. I. PASPALOIDEÆ. *Spikelets* 2-seriate, close-set on the undersurface of the flat rachis of a simple spike, globose or ovoid; awn 0; gl. I very small, IV more or less rugose.—Perennials. *Spikes* alternate forming a simple raceme. (*Sp.* 1–4.)

Sect. II. ECHINOCHLOA. *Spikelets* 3–4-seriate (2-seriate in *P. notabile*) crowded on the undersurface of a simple or rarely branched spike, globose or ovoid; gl. I half as long as III or shorter, II and III strongly nerved cuspidate or rigidly awned, IV hard in fruit.—Annuals. *Spikes* alternate or crowded in usually a simple raceme. (*Sp.* 5–7.)

Sect. III. BRACHIARIA. *Spikelets* irregularly 1–2- (rarely 3-) seriate on the slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, ovoid or obovoid; gl. I not half as long as III (except in *P. ambiguum*), II and III subequal, awn 0, or IV with a very short awn concealed by gls. II and III. (*Sp.* 8–18.)

Sect. IV. HYMENACHNE. *Spikelets* small, crowded in spiciform panicles (except *P. auratum* and *curvatum*) ovoid or lanceolate, sometimes decurved; gls. usually strongly ribbed, I much shorter than III, IV usually much shorter than III, narrow, white. (*Sp.* 19–25.)

Most of the species of this section are very variable.

Sect. V. BREVIGLUMÆ. *Spikelets* very small, in pairs or fascicles on the filiform branches of a lax panicle or simple rachis, dorsally much compressed; gl. I and II both much shorter than IV, III and IV lanceolate. (*Sp.* 26, 27.)

Sect. VI. EFFUSÆ. *Spikelets* solitary, rarely binate, sessile or pedicelled on the slender branches of a decompound usually open panicle. (See also *P. auratum* and *curvatum* in Sect. *Hymenachne*.) (*Sp.* 28–47.)

II. *Branchlets of panicle often produced beyond the terminal spikelet into a rigid awn-like bristle.*

Sect. VII. PTYCHOPHYLLUM. *Spikelets* solitary, sessile or pedicelled on the slender branches of a decompound open panicle. *Leaves* plicate. (See also *Setaria Forbesiana.*) (*Sp.* 48, 49.)

B. Spikelets strongly laterally compressed.

Sect. VIII. GIBBOSÆ. *Spikelets* very minute, panicled; gl. IV semilunar. Perennial very slender grasses. (*Sp.* 50–54.)

Sect. IX. PSEUDECHINOLÆNA. *Spikelets* rather large, distant, subsessile on a slender simple or sparingly divided rachis, often glandular. (*Sp.* 55.)

Sect. I. PASPALOIDEÆ. (See p. 27.)

1. **P. Isachne,** *Roth Nov. Sp.* 54; spikes many longer than the internodes, spikelets $\frac{1}{15}$ in. suberect oblong acute villous, gl. I minute, II and III equal faintly 3-nerved, II = IV, III paleate empty, IV oblong rounded at both ends quite smooth. *Roem. & Sch. Syst.* ii. 458; *Schult. Mant.* ii. 252; *Kunth Enum. Pl.* i. 97; *Steud. Syn. Gram.* 57. P. eruciforme, *Sibth. Fl. Græc.* i. t. 59; *Sibth. & Sm. Prodr. Fl. Græc.* i. 40; *Roem. & Sch. l. c.* 426; *Kunth l. c.* 78; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 104; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 43, *Fodd. Grass. N. Ind.* 6; *Baker Fl. Maurit.* 434; *Parlat. Fl. Ital.* i. 119; *Boiss. Fl. Orient.* v. 437. P. Koenigii, *Herb. Wight ex Nees Fl. Afr. Austr.* 30. P. caucasicum, *Trin. in Mem. Acad. Petersb. Ser.* 6 (1835) iii. 237, *Sp. Gram. Ic.* t. 262, *Panic. Gen.* 149; *Steud l. c.* P. Crus Galli, *Roxb. ex Wight Cat.* n. 1616 (*non Fl. Ind.*) P. pubinode, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 363; *Steud. l. c.* 57. P. Wightianum, *Arn. & Nees. ex Nees Fl. Afr. Austr.* 30. P. Wightii, *Nees l. c.* 29; *Trin. Pan. Gen.* 148; *Steud. l. c.* 58. Brachiaria eruciformis, *Griseb. in Ledeb. Fl. Ross.* iv. 469. Echinochloa eruciformis, *Reichb. Ic. Fl. Germ.* t. 29; *C. Koch, in Linnæa,* xxi. (1848) 437.—Panicum, *Wall. Cat.* n. 8693.

Plains of INDIA; in watery places, from Kashmir, alt. 6000 ft., and the Panjab, to Bengal, and southward to CEYLON.—DISTRIB. Westward to Italy and N. Africa.

Stems 1–2 ft., slender, ascending from a decumbent base, much branched; nodes often bearded. *Leaves* 1-2½ in. by ¼–⅓ in., glaucous, linear-lanceolate, acuminate, flat, glabrous or softly hairy, base rounded; mouth of sheath with long hairs. *Spikes* 8–12, ½–1 in. long, erect or suberect; rachis narrower than the spikelets, ciliate. *Spikelets* subsessile, very pale; gls. membranous, I cordate; II about ⅔ shorter than IV, which is white.

2. **P. flavidum,** *Retz. Obs.* iv. 15; spikes erect shorter than the internodes, spikelets $\frac{1}{16}$–$\frac{1}{10}$ in. divaricate gibbously globose glabrous, gl. I = about ½ III suborbicular 3-nerved, II nearly = IV 7-nerved tip rounded, III oblong obtuse 3–5-nerved paleate neuter, IV broadly ovate cuspidate reticulately punctulate. *Br. Prodr.* 190; *Kunth Revis. Gram.* i. 211, t. 17, *Enum. Pl.* i. 78, *Suppl.* 60; *Trin. Panic. Gen.* 151; *Nees Agrost. Bras.* ii. 116; *Griff. Notul.* iii. 33, *Ic. Pl. Asiat.* t. 139, fig. 67; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. vi., *Fodd. Grass. N. Ind.* 7; *Wight Cat.* n. 1613, & *Herb.* n. 3059; *Wall. Cat.* n. 8692 (*excl. B, & H*

partim); *Benth. Fl. Austral.* vii. 474. P. brizoides, *Jacq. Eclog. Gram.* 2, t. 2; *Trin. Diss.* ii. 128, *Sp. Gram. Ic.* t. 158, 159; *Kunth Enum. Pl.* i. 78; *Roxb. Fl. Ind.* i. 293; *Dalz. & Gibs. Bomb. Fl.* 290; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 159; *Duthie Grass. N.W. Ind.* 2; *Miq. Fl. Ind. Bat.* iii. 445; *Aitchis. Cat. Panjab Pl.* 159; *Nees Agrost. Bras.* 115; *Baker Fl. Maurit.* 433. P. distans, *Trin. Sp. Gram. Ic.* t. 172. P. brizoides, *var.* distans, *Trin. Ic.* t. 159 B. P. flaccidum, *Koen. mss. in Herb. Mus. Brit.* P. floridum, *Royle Ill. Bot. Himal.* 420. P. granulare, *Lam. Ill.* i. 170, *Encycl.* iv. 740; *Trin. Diss.* ii. 129. P. Sama, *Ham. ex Wall. Cat.* 8692 F.

Plains of India; in watery places from the Panjab to Assam and Burma, ascending to 5000 ft. in Nepal and Kumaon, and southward to CEYLON.—DISTRIB. Trop. Asia and Africa.

Stem 1–4 ft., compressed, leafy, branched from the decumbent base. *Leaves* bifarious, 3–5 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear-lanceolate acuminate, or ligulate with a rounded tip; sheaths compressed, lower tumid, mouth hairy; ligule 0. *Spikes* few or many, distant, $\frac{1}{2}$–1 in. *Spikelets* 2-20, very pale, sessile. *Glumes* membranous, white with green nerves; III neuter or male; IV sometimes almost orbicular, white or brownish, very minutely rough.—The var. *distans* of Trinius is a depauperate state, and occurs on the same plant as the normal. A still more depauperate form, densely tufted, with stems and leaves 2–3 in. long and very few spikelets, is Wall. Cat. 8692 D from Herb. Wight, also found in Bengal. Mr. Rendle informs me that the name *flavidum* may be a mistake for *flaccidum*, under which Koenig sent it to Retzius from Herb. Mus. Brit. where it is named *flaccidum*.

3. **P. punctatum**, *Burm. Fl. Ind.* 26; spikes longer than the internodes tip usually excurrent setiform, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. plano-convex erecto-patent glabrous, gl. I very short truncate, II = about half IV suborbicular 3-nerved tip rounded or truncate, III ovate acute 3–5-nerved neuter, IV ovate cuspidately acuminate granulate. P. fluitans, *Retz. Obs.* iii. 8 (*not* v. 18); *Roxb. Fl. Ind.* i. 293; *Griff. Notul.* iii. 25, *Ic. Pl. Asiat.* 139, f. 231; *Dalz. & Gibs. Bomb. Fl.* 290; *Thw. Enum. Pl. Zeyl.* 339; *Trim. Cat. Ceyl. Pl.* 104; *Aitchis. Cat. Panjab. Pl.* 159; *Duthie Grass. N.W. Ind.* 4, *Indig. Fodd. Grass.* t. 44, *Fodd. Grass. N. Ind.* 7; *Baker Fl. Maurit.* 433; *Boiss. Fl. Orient.* v. 437; *Steud. Syn. Gram.* 59; *Nees Agrost. Bras.* 115. P. brizoides, *Retz. l.c.*; *Rottl. in Naturf. Fl. Ges. Neue Schrift.* iv. (1803) 211; *Wall. Cat.* n. 8690; *Wight Cat.* n. 1614. P. fluitans, *Herb. Madr.*; *Wall. Cat.* n. 8692 B. P. granulare, *Bojer Hort. Maurit.* 364. P. mucronatum, *Roth Nov. Sp.* 45; *Steud. l.c.*; *Nees Agrost. Bras.* 116. P. paspaloides, *Wall. l.c.* n. 8691 A (*partim*), B.

Marshes throughout INDIA, from the Panjab to Assam, and southwards to Malacca and CEYLON.—DISTRIB. Malaya, Mauritius, trop. and N. Africa.

Perennial, quite glabrous. *Stem* 2–4 ft., base floating, rooting at the nodes, lower internodes very stout, spongy. *Leaves* 4–8 in., linear, acute or acuminate, lower sheaths dilated; ligule a ring of hairs. *Spikes* many, $\frac{1}{2}$–1 in., distant, sessile, secund, appressed to the glabrous rachis, very pale; rachis about $\frac{1}{16}$ in. broad, margin quite smooth, tip free acicular as long as the upper spikelet. *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in. long, imbricate, sessile, ovate-oblong. *Glumes* membranous, IV as long as III.—Mr. Rendle informs me that he has examined in the British Museum the specimen (in Herb. Sloane) on the figure of which Burman founded *P. punctatum*, and that it is the same as *P. fluitans*, Retz. And further, that the name *fluitans* is a ms. one of Koenig, and was no doubt sent by him to Retz, who says that he received the plant from Koenig. As to the rival claims of *punctatum* and *fluitans* for adoption the former (published in 1768) has a quarter of century's priority; but whereas the *P. fluitans* has had more than a century of recognition in all countries, *P. punctatum*

has never till now been recognized, nor could it have been from Burman's description only. Under these circumstances, and taking into consideration the facts, that Retz described two different plants under the name of *fluitans*, and that *punctatum* has been applied to no other species, I have adopted the latter.

4. **P. paspaloides,** *Pers. Syn.* i. 81 (paspalodes); spikes erect longer than the internodes, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. erecto-patent subglobose glabrous, gl. I very short suborbicular retuse, II nearly = IV strongly 5-nerved tip rounded, III broadly ovate acute 5-nerved paleate neuter, IV oblong subacute nearly smooth. *Kunth Enum. Pl.* i. 77; *Trin. Pan. Gen.* 153. *Wall. Cat.* 8691 (*in part*); *Steud. Syn. Gram.* 60; *Boiss. Fl. Orient.* v. 436. P. affine, *Nees Agrost. Bras.* 113. P. appressum, *Doell in Mart. Fl. Bras.* ii. II 184. P. beckmanniæforme, *Mikan ex Trin. in Spreng. Neue Entdeck.* ii. 83; *Spreng. Syst.* i. 309. P brizæforme, *Presl Rel. Hænk.* 302; *Steud. l. c.* 60. P. brizoides, *Lamk. Ill.* i. 170 (*not Trin. or Jacq.*). P. carnosum, *Saltzm. ex Steud. l. c.* P. fluitans, *Retz. Obs.* v. 18; *Miq. Fl. Ind. Bat.* iii. 455. P. numidianum, *Sieb. ex Schult. Mant.* ii. 267 (*not Lamk.*). P. truncatum, *Trin. Diss.* ii. 130, *Sp. Gram. Ic.* t. 168 (*not* t. 172). Paspalum adpressum, *Pers. Syn.* i. 85; *Rich. ex Lamk. l. c.* 176. Digitaria affinis, *Roem.* and *Sch. Syst.* ii. 470.

KUMAON, *Strachey & Winterbottom*, alt. 5000 ft. UPPER GANGETIC PLAIN; Delhi, *Clarke*. BUNDELKUND, *Duthie*. SCIND, the CONCAN, MALABAR and TRANQUEBAR, *Heyne*, &c. CEYLON, *Walker*, &c.—DISTRIB. Affghanistan, Arabia, Afric. and Amer. trop.

Perennial, stem glabrous; prostrate, usually floating below and rooting at the nodes. *Leaves* spreading, linear, acuminate acute or obtuse, lower sheaths dilated. *Spikes* ½–1 in., appressed to the narrow, compressed, setulose rachis. *Spikelets* subsessile, turgid. *Glumes* membranous.—Habit of *P. punctatum*, which it closely resembles, but differs in the rachis of the spikes not produced at the tip with a few imperfect terminal spikelets, in the size of gl. II, in paleate III, and smooth IV.—*P. brizoides*, Lamk., is the earliest name, but it has been so promiscuously applied that it is better abandoned.

Sect. II. ECHINOCHLOA. (See p. 27.)

5. **P. Crus-galli,** *Linn. Sp. Pl.* 56; stem erect, leaves linear flat glabrous or scaberulous, raceme contracted or pyramidal, spikes many 2–4 in. often secund simple or subcompound, rachis setulose, spikelets $\frac{1}{2}$–$\frac{1}{8}$ in. (*excl. awn*) subglobose hispid or scabrid rarely glabrous, gl. I = c–$\frac{1}{3}$ III acute 3–5-nerved, II = III mucronate or shortly awned, III paleate male or neuter awned, awn short or long rigid scabrid, IV ovoid obtuse or cuspidate and palea coriaceous shining white. *Fl. Dan.* t. 852, & t. 1564; *Host Gram. Austr.* ii. 15, t. 19; *Encycl. Bot.* t. 276; *Knapp Gram. Britt.* t. xi.; *Reichb. Ic. Fl. Germ.* t. 29; *Trin. Sp. Gram. Ic.* t. 161, 162; *Wall. Cat.* n. 8687 (*excl. I.*); *Thw. Enum. Pl. Zeyl.* 359 (*excl. Syn. colonum*); *Trim. Cat. Ceyl. Pl.* 104; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 5, *Fodd. Grass. N. Ind.* 4; *Miq. Fl. Ind. Bat.* iii. 464; *Benth. Fl. Hongk.* 411, *Fl. Austral.* vii. 479; *Boiss. Fl. Orient.* v. 435; *Franch. & Sav. En. Pl. Jap.* ii. 160; *Griseb. Fl. Brit. W. Ind.* 546. P. Burmanni, *Bieb. Fl. Taur. Cauc.* iii. 57, *ex Link. Hort. Berol.* i. 204. P. crvipes, *Stokes Bot. Mat. Med.* i. 141. P. digitatum, *Gilib. Exercit.* 517. P. dubium, *Sieb. ex Steud. Nom. Ed.* II, ii. 256, *Syn. Gram.* 46. P. echinatum, *Willd. Enum. Hort. Berol.* 1032; *Trin. Sp. Gram. Ic.* t. 162; *Jacq. Eclog. Gram.* ii. 28, t. 20. P. hirtellum, *Walt. Fl. Carol.* 72. P. hirti-

calycinum, *Steud. Nom. Ed.* II, ii. 257. P. hispidulum, *Lamk. Encycl.* iv. 744 (*non Del.*); *Retz Obs.* v. 18; *Roxb. Fl. Ind.* i. 303 (*fid. Ic. Pict.*); *Wall. Cat.* 8688 A.; *Wight Cat.* n. 2042; *Steud. Syn. Gram.* 47; *Franch. & Sav. l. c.* 160. P. hispidum, *Forst. Prodr.* 7; *Nees Agrost. Bras.* 257. P. horridum, *Saltzm. ex Steud. l. c.* 47. P. Hosti, *Bieb. l. c.* P. limosum, *Presl ex Nees l.c.* P. longisetum, *Torr. in Am. Journ. Sc. Ser.* I iv. (1822) 58. P. mirabile, *Braun Del. Sem. Hort. Carlsruhe* (1846). P. muricatum, *Michx. Fl. Bor. Am.* i. 47. P. oryzinum, *Gmel. Syst.* i. 157; *A. Braun in Ind. Sem. Hort. Berol.* 1851. P. pilosum, *Dalz. & Gibs. Bomb. Fl. Suppl.* 98. P. sabulicolum, *Nees Agrost. Bras.* 258. P. scabrum, *Lamk. Ill.* i. 171; *Wight Cat.* n. 1648; *Steud. l. c.* 47. P. stagninum, *Retz. Obs.* v. 17; *Host Gram. Austr.* iii. t. 51; *Koen. in Naturf. l. c.*; *Roxb. Fl. Ind.* i. 295; *Nees in Mart. l. c.* 26; *Griff. Notul.* iii. 17; *Wall. Cat.* n. 8688; *Wight Cat.* n. 1649. P. Walteri, *Pursh Fl. Am. Sept.* i. 66. Oplismenus Crus-galli, *Dum. Obs. Gram. Belg.* 138; *Kunth Revis. Gram.* i. 44, *Enum. Pl.* i. 143; *Host l. c.* ii. t. 19; *Trin. Sp. Gram. Ic.* t. 161; *Dalz. & Gibs. Bomb. Fl.* 292. O. Crus-pavonis, *H. B. &. K. Nov. Gen. & Sp.* i. 108. O.? dubius, *Kunth Rev. Gram.* i. 44, *Enum.* i. 143. O. limosus, *Presl Rel. Hænk.* i. 321; *Kunth Enum.* i. 144. O. longisetus, *Kunth Revis. Gram. l. c.* O. muricatus, *Kunth l. c.* 44. O. sabulicolus, *Kunth Enum.* i. 145. O. scaber, *Kunth Rev. Gram.* i. 44. O. stagninus, *Kunth Revis. l. c., Enum. l. c.*; *Dalz. & Gibs. l. c.*; *Aitchis. Cat. Punjab Pl.* 161; *Miq. l. c.* 464. Echinochloa commutata, *Schult. Mant.* ii. 267. E. Crus corvi, *Beauv. Agrost.* 53. E. Crus-galli, *Beauv. l. c.*; *T. Nees Gen. Fl. Germ. Monocot.* I t. 21; *Reichb. Ic. Fl. Germ.* t. 29. E.? dubia, *Roem & Sch. Syst.* i. 479. E. hispida, *Schult. l. c.* E. hispidula, *Nees in Royle Ill. Bot. Himal.* 416, 420; *Dalz. & Gibs. l. c. Suppl.* 98. E. stagnina, *Beauv. l. c.* Orthopogon Crus-galli & Retzii, *Spreng. Syst.* i. 307. Ischæmum abbreviatum & fasciculatum, *Herb. Ham. ex Wall. Cat.* n. 8688. Digitaria hispidula, *Willd. Enum. Hort. Berol.* 91. Milium Crus-galli, *Moench. Meth.* 202.

Throughout INDIA, especially in wet places and rich soils—DISTRIB. all warm countries.

Annual. *Stem* 1–3 ft., stout or slender, erect or decumbent below, simple or branched. *Leaves* flat, up to an inch broad, glabrous or hairy; ligule 0. *Raceme* 4–8 in., usually inclined, or drooping. *Spikes* sessile or subsessile, upper gradually shorter, erect erecto-patent or rarely decurved. *Spikelets* densely packed in 3–5 rows, turgid; gl. I not awned; II and III subequal, usually 5-nerved, awn of III sometimes 1½ in. long; IV from orbicular to broadly oblong.—Amongst the innumerable varieties of *P. Crus-galli*, I find it impossible to find characters constant enough for their limitation. Of exceptional states one with almost glabrous spikes is *Echinochloa glabrescens* (Munro mss.); it has large spikelets and cuspidate gls. It is Wallich's n. 8687 E. B. C. H., and has been collected in the Western Himalaya, Khasia Hills and elsewhere. Another is *Ischaemum glabrescens*, Ham. ex Wall. Cat. n. 8688 D, with the stem nearly as thick as the little finger, solitary or 2-nate spikes, and spikelets with tubercle-based bristles. Thwaites CP. 900 and 3237, from Ceylon is a third, it has very broad leaves, and the rachis of the spikes is villously hairy. *P. mirabile*, Braun, is a remarkable plant, with 3-fld spikelets, the lower fl. paleate and neuter, two upper hermaphrodite. Some forms with cuspidate, very shortly awned spikelets pass into *P. colonum*, through var. *frumentaceum*, and it is not unlikely that some of the synonyms placed under *P. Crus-galli* should be transferred to *P. colonum*, and *vice versa*.

Var. *frumentaceum*; tall, robust, spikes thickened incurved sometimes corymbose with densely crowded unawned spikelets, otherwise as *P. Crus-galli*. P. frumentaceum, *Roxb. Fl. Ind.* i. 304; *Schult. Mant.* ii. 230; *Trin. Sp. Gram. Ic.* t. 164; *Diss.* ii. 132; *Wall. Cat.* n. 8686; *Wight Cat.* n. 1617; *Duthie Grass. N.W. Ind.* 4,

Field & Gard. Crops 3, t. 24, *Fodd. Grass. N. Ind.* 8; *Franch. & Sav. En. Pl. Jap.* ii. 161. P. Crus-galli, *Wall. Cat.* n. 8687, C. G. P. Crus-galli, *var.* frumentaceum *Trim. Cat. Ceyl. Pl.* 104. P. grossum, *Salisb. Prodr.* 18. P. segetale, *Herb. Roxb.* Oplismenus frumentaceus, *Kunth Revis. Gram.* i. 45, *Enum. Pl.* i. 146; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98. Echinochloa frumentacea, *Link Enum. Hort. Berol.* i. 204; *Aitchis. Cat. Panjab Pl.* 161; *Miq. Fl. Ind. Bat.* iii. 465.—Cultivated in the hotter parts of Asia and Africa.—Roxburgh (*Fl. Ind. l. c.*) says of *P. hispidulum*, which is undoubtedly referable to *P. Crus-galli*, "it comes very near my *P. frumentaceum*, and may probably be the same in its wild state."

6. **P. colonum,** *Linn. Syst. Ed.* x. 870; stem rather slender decumbent or shortly creeping below, leaves narrow scaberulous, raceme contracted, spikes suberect 1–1½ in. usually distant, rachis pilose, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. acute or subcuspidate glabrous or hispidulous, gl. I = ½ III or shorter acute 3–5-nerved, II and III subequal acute, III paleate, IV ovoid or oblong obtuse or acute and palea coriaceous white. *Jacq. Eclog. Gram.* t. 32; *Ehret. Ic. Sel.* t. 3, f. 3; *Beauv. Agrost.* t. x. f. 6; *Trin. Sp. Gram. Ic.* t. 160; *Steud. Syn. Gram.* 46; *Wall. Cat.* n. 8685; *Trim. Cat. Ceyl. Pl.* 104; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 4, *Fodd. Grass. N. Ind.* 4; *Benth. Fl. Hongk.* 411, *Fl. Austral.* vii. 478; *Boiss. Fl. Orient.* v. 435; *Franch. & Sav. En. Pl. Jap.* ii. 160; *Griseb. Fl. Brit. W. Ind.* 545. P. arabicum, *Nees ex Steud. Nom. Ed.* II, ii. 251, *Syn. Gram.* 63. P. brizoides, *Linn. Mant.* i. 184. P. cæsium, *Nees in Hook. & Arn. Bot. Beech. Voy.* 235; *Steud. l. c.* 47. P. confertum, *Herb. Rottl. ex Wall. Cat.* n. 8687 B. P. Crus-galli, *Wall. Cat.* n. 8687 I; var. colonum, *Coss. Expl. Alger.* 28; var. minor, *Thw. Enum. Pl. Zeyl.* 359. P. cuspidatum, *Roxb. Fl. Ind.* i. 298; *Duthie Grass. N.W. Ind.* 3; *Steud. l. c.*; *Fig. & de Not. in. Mem. Acad. Tor.* (1854) 340, t. xiii. f. 1–16. P. Daltoni, *Parlat. ex Webb in Hook. Niger Fl.* 185; *Steud. l. c.* P. flaccidum, *Wall. Cat.* n. 8692 H (*in part*). P. grossarium, *Griff. Notul.* iii. 36, *Ic. Pl. Asiat.* t. 139, f. 113. P. hæmatodes, *Presl Fl. Sic.* i. 43; *Steud. l. c.* P. numidianum. *Presl Cyp. & Gram. Sic.* 19. P. Petiveri, *Kotsch. ex Griseb. Fl. Brit. W. Ind.* 545. P. pictum, *Kœn. in Naturf.* xxiii. (1788) 204; *Wight Cat.* n. 1648; *Nees in Mart. Fl. Bras.* ii. 120? P. Pseudo-colonum, *Roth Nov. Sp.* 147; *Steud. l. c.* 46. P. semiverticillatum, *Herb. Rottl.* (*non Rottl. in Ainsl. Mat. Med.*). P. tetrastichum, *Forsk. Fl. Æg. Arab.* 19. P. zonale, *Presl Prodr. Fl. Sic.* i. 82. Oplismenus colonus, *H. B & K. Nov. Gen. & Sp.* i. 108; *Kunth Enum. Pl.* i. 142; *Dalz. & Gibs. Bomb. Fl.* 291; *Aitchis. Cat. Punjab Pl.* 161. O.? cuspidatus, *Kunth Revis. Gram.* i. 45, *Enum.* i. 147. O. Pseudo-colonus, *Kunth l. l. c.* 44, 142. Digitaria? cuspidata, *Schult. Mant.* ii. 265.—Panicum, *Wall. Cat.* n. 8694, 8726.—*Sloane Hist. Jam.* i. t. 64, f. 3.

Throughout INDIA and Ceylon, ascending the Himalaya to 6000 ft.—DISTRIB. all warm countries.

In its typical form *P. colonum* differs from *Crus-galli* by the characters given above, but there is a gradual transition of one into the other; and the cultivated var. *frumentaceum* has been assigned to both, having the unawned spikelets of the former, and the broad leaves robust habit and long crowded spikes with crowded spikelets of the latter. I find it very difficult in many cases to decide whether to refer certain specimens to the one or to the other, and am not at all confident that the synonymy of the two is in all cases right. Both Cosson and Thwaites regard *colonum* as a form of *Crus-galli*.

7. **P. notabile,** *Hook. f.*; spikes much longer than the internodes, rachis scabrid, spikelets ⅛ in. 2–3-seriate silkily hairy, gl. II subaristately

acuminate, III paleate male, IV orbicular-oblong rugulose shortly awned. —Panicum, *Wall. Cat.* n. 8723.

Burma; Petroleum wells of the Irawaddi, *Wallich.*

Stem 18–24 in., robust and foliage of *Crus-galli*, nodes pubescent. *Leaves* 3–5 in., finely acuminate, ciliate towards the base; sheaths sparsely hairy; ligule 0. *Panicle* 5 in., rachis flattened and angular, much narrower than the spikelets. *Spikelets* erect, imbricate, pale, sparsely silkily pubescent; gls. membranous, I=$\frac{1}{2}$ III, broadly ovate, obtuse, 3-nerved; II ovate, finely beaked, 5-nerved, hirsute; III very broadly obovate, cuspidately acuminate, the inflexed margins densely ciliate with long erect hairs; awn of IV as long as itself, strict, scabrid.—A very remarkable grass, with the habit of *P. Crus-galli*, but with the rugulose awned gl. IV of *P. javanicum*, and hence intermediate between the sections *Echinochloa* and *Brachiaria*.

Sect. III. Brachiaria. (See p. 27.)

See *P. turgidum* in Sect. Effusæ.

* Gl. I nearly as long as III; IV shortly awned.

8. **P. ambiguum,** *Trin. Gen. Panic.* 155; leaves narrow hairy base rounded, spikes few suberect, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in., glabrous, gl. I ovate acute 5-nerved, II ovate-lanceolate acuminate 7-nerved, III epaleate, IV oblong minutely rugulose. *Steud. Syn. Gram.* 61. P. infidum, *Trim. Cat. Ceyl. Pl.* 104 (*non Trin.*). P. javanicum, *Thw. Enum. Pl. Zeyl.* 358. P. sanguinale, *Burm. Fl. Ind.* t. 10, f. 2 (*non descr.*). Urochloa paspaloides, *Presl Rel. Hænk.* i. 318 (*fid. Trin.*); *Kunth Enum. Pl.* i. 75.

Burma; Mergui, *Griffith.* Ceylon, *Gardner, Thwaites* (CP. n. 858, 3244).—Distrib. Mascarene, Malay and Pacific Islds.

Annual. *Stems* 1–2 ft., slender, much branched from the base; nodes glabrous or puberulous. *Leaves* 3–6 by $\frac{1}{6}$–$\frac{1}{3}$ in., acuminate; sheaths glabrous or margins ciliate; ligule a tuft of hairs. *Spikes* 3–4, 1–2 in.; rachis slender, triquetrous, glabrous or with a few hairs at the nodes. *Spikelets* 2-seriate, alternate, suberect; palea of IV with green nerves; awn of IV concealed by II and III.—The subequal gls. I and III will distinguish this from all other species of the *Brachiaria* section. *P. ambiguum*, Fig. & de Notar. is a very different plant. Presl describes two varieties in the Philippines; *α* lower gl. hardly half as long as the others; *β* glumes subæquilong. I have seen no Indian or other specimens answering to *α*.

** Gl. I much shorter than III; IV often abruptly apiculate.

§ Spikelets $\frac{1}{20}$–$\frac{1}{16}$ in.

9. **P. prostratum,** *Lamk. Illustr.* i. 171, *Encycl.* iv. 745; leaves short, base broad amplexicaul and sheaths ciliate, spikes usually crowded suberect, rachis trigonous, pedicels with long cilia, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. crowded subsessile 2–3-seriate ellipsoid glabrous, gl. I very short semilunar, II ovate acute 5–7-nerved, III 5-nerved paleate, IV obovate apiculate minutely rugulose. *Trin. Diss.* ii. 150, *Panic. Gen.* 158, *Sp. Gram. Ic.* t. 184, 185; *Kunth Enum. Pl.* i. 89, *Suppl.* 68; *Steud. Syn. Gram.* 62; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab. Pl.* 160; *Duthie Grass. N.W. Ind.* 6, *Indig. Fodd. Grass.* t. 45, *Fodd. Grass. N. Ind.* 11; *Benth. Fl. Austral.* vii. 476; *Griseb. Fl. Brit. W. Ind.* 540. P. barbatum, *Lamk. Illustr. l. c.* P. cæspitosum, *Sw. Fl. Ind. Occ.* i. 146. P. crispum, *Llanos Fragment.* 42. P. hirsutum, *Heyne ex Wall. Cat.* n. 8734 B. P. marginatum, *Vahl ex Herb. Rottl. et ex Wall. Cat.* n. 8732

B. P. procumbens, *Nees Agrost. Bras.* 109; *Herb. Wight*, n. 3052. P. repens, *Burm.* var. alt. *Fl. Ind.* t. 11, *f.* 1; *Rottl. in Neue Schrift.* iv. (1803) 182. P. setigerum, *Herb. Roxb. ex Wall. Cat.* n. 8733 A. D. P. Sieberi, *Link. Hort. Berol.* i. 207. P. viaticum, *Saltzm. ex Doell. in Mart. Fl. Bras.* ii. II 155.—Panicum, *Wall. Cat.* n. 8733 A—D. 8734 B. C. D. Gramen paniceum minus, &c. *Petiv. ex Scheuchz. Agrost.* 51 (*non P. Petiverii*, Trin.).

Plains of India, from the Panjab to Assam and Burma, and southward to Ceylon.—Distrib. Tropics generally.

Annual or perennial, usually small; stem 4–18 in., creeping below; nodes glabrous. *Leaves* 1–2 in., up to $\frac{3}{4}$ in. broad, ovate-lanceolate, acuminate; sheaths ciliate; ligule 0. *Panicle* usually shortly peduncled. *Spikes* subsecund, at length spreading; rachis scabrid and hairy. *Spikelets* pale, rather turgid; pedicels with cilia longer than the spikelets; gl. I nerveless or 3-nerved; palea of III oblong, acute.—A common Bengal plant, of which and *P. villosum* I find it impossible to unravel the synonymy with confidence. Nees (*Agrost. Bras.* 109) includes under *procumbens*, *repens*, Burm. & Roxb. (*not Linn.*), *prostratum*, β Lamk., *setigerum*, Retz & Roxb., *umbrosum*, Retz & Roxb., *grossarium*, Koen. (*not Linn.*), *barbatum*, Lamk., & *subcordatum*, Roth. Wight (Cat.) includes under *procumbens*, Nees, besides most of the above, *P. hirtum*, Roth (*Rothii*, Spreng.) which is *Oplismenus compositus*. Mr. Rendle informs me that Petiver's plant, which Trinius cites as the type of his *P. Petiverii*, is *P. prostratum*, Lamk., but that the *P. Petiverii* of Trinius' Icones is *P. grossarium*, Koen., *not Linn.*), which I refer to the *P. ramosum*.

Var. *rigidum*; stem very stout wholly prostrate much branched, leaves $\frac{1}{2}$ in. triangular-ovate rigid pungent ciliate with long hairs.—*Wall. Cat.* n. 8723 (*in part*). Calcutta, *Clarke*? Burma, *Wallich*. (The specimen has evidently been misplaced in the sheet of *P. notabile*.)

Var. *burmanicum*; leaves sparsely hairy beneath, gl. II and III puberulous.—Burma, *Collett*.

10. **P. villosum**, *Lamk. Illustr.* i. 173, *Encycl.* iv. 745; leaves ovate-oblong obtuse or acute densely pubescent on both surfaces base rounded, spikes secund erect tomentose, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. ellipsoid glabrous or tomentose, gl. I very short semi-lunar nerveless, II ovate acute 7-nerved, III ovate-oblong acute paleate, IV obovate abruptly apiculate minutely rugulose. *Kunth Enum. Pl.* i. 98; *Herb. Wight* n. 3053. ?P. Careyanum, *Nees Agrost. Bras.* 118. P. coccospermum, *Steud. Syn. Gram.* 62; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 105. P. grossarium, *Roxb. Fl. Ind.* i. 297; *Hochst. in Herb. Hohen.* n. 919. P. nanum, *Nees in Herb. Royle, ex Steud. l. c.*; *Duthie Grass. N.W. Ind.* 5. P. nilagiricum, *Steud. l. c.* P. procumbens, β (setigerum, *Roxb.*) *Wight Cat.* n. 3053. P. repens, *Roxb. Fl. Ind.* i. 299. P. vestitum, *Nees in Herb. Royle ex Steud. l. c.*; *Aitchis. Cat. Panjab. Pl.* 160; *Duthie Grass. N.W. Ind.* 7, *Fodd. Grass. N. Ind.* 13.—Panicum, *Wall. Cat.* n. 8733 E, 8735.

Subtropical and tropical Himalaya, from the Chenab to Sikkim, alt. 3–6000 ft. Khasia Hills, alt. 2–6000 ft. Nilghiri Hills. Burma, *Wallich*. Ceylon, *Gardner*.—Distrib. Tonkin, China.

Annual. Habit of *P. prostratum*, with which it has been confounded, but is a hill plant, distinguished by its hairy leaves and much more hairy spike and spikelets.

†† Spikelets $\frac{1}{10}$–$\frac{1}{8}$ in.

§ *Spikelets usually close together, more or less imbricating.*

10*. **P. muticum,** *Forsk. Fl. Aeg. Arab.* 20; stout, nodes bearded,

leaves long, base subcordate, panicle deltoid glabrous, spikes alternate, rachis narrow flattened, spikelets $\frac{1}{8}$ in. crowded ovoid acute glabrous, gl. I = $\frac{1}{4}$ of III ovate acute 1-nerved, II and III subequal 5-nerved, III paleate male, IV ellipsoid obtuse margins narrowly incurved. *Schult. Mant.* ii. 225; *Kunth Enum. Pl.* i. 93; *Steud. Syn. Gram.* 40. P. amphibium, *Steud. l. c.* 61; *Zoll. Pl. Rar. Jav.* 416. P. barbinode, *Trin. Gram. Panic.* 168, *Sp. Gram. Ic.* t. 318; *Thw. Enum. Pl. Zeyl.* 361; *Steud. l. c.* 67; *Duthie Grass. N.W. Ind.* 2. P. equinum, *Saltzm. ex Steud. l. c.* P. leiogonum, *Sieb. Pl. Egypt. exsicc.*; *Link. Hort. Berol.* i. 206; *Steud. l. c.* 79. P. Meyerianum, *Nees Fl. Afr. Austr.* i. 32; *Steud. l. c.* 61. P. molle, *Griseb. Fl. Brit. W. Ind.* 547 (*excl. Syn.*) *non Sw.*; *Baker Fl. Maurit.* 436; *Trim. Cat. Ceyl. Pl.* 105 (*non Sw.*). P. numidianum, *Lamk. Ill.* i. 122, *Dict.* iv. 749; *Desf. Fl. Atlant.* i. 60, t. 11; *Trin. Sp. Gram. Ic.* t. 174; *Steud. l. c.* 345; *Doell. in Mart. Fl. Bras.* ii. II. 187. P. pictiglume, *Steud. l. c.* 73. P. paraguayense, *Steud. in Pl. Rengz* (*name only*). P. punctulatum, *Arn. ex Wight Cat.* n. 2039; *Steud. l. c.* 62. P. purpurascens, *Raddi ex Opiz. in Flora*, v. (1822) 266; *Nees Agrost. Bras.* 240; *Steud. l. c.* 57. P. sarmentosum, *Hassk. Pl. Jav. Rar* 17 (*non Roxb.*). Paspalum mollicomum, *Kunth l. c.* 47; *Steud. l. c.* 31. Digitaria mauritiana, *Wall. mss* (*Ic. in Herb. Kew*).—Panicum, *Wall. Cat.* n. 8724.

BENGAL and CEYLON, in marshes, cultivated or naturalized.—DISTRIB. Java, Africa, America.

Stem ascending, 6–8 ft. high; nodes softly bearded, rarely glabrescent. *Leaves* 6–10 by $\frac{1}{2}$–$\frac{2}{3}$ in., and sheaths glabrous or hairy; ligule short, ciliate. *Panicle* erect, 3–5 in.; rachis stiff, scabrid. *Spikes* rather distant, stout, simple or divided below, lower 2–4 in., upper gradually shorter, rachis $\frac{1}{20}$ in. broad subhispid. *Spikelets* turgid, sometimes solitary and alternate throughout the spike, green or purplish; gl. IV obscurely dotted or roughened.—The Water-grass of the Mauritius and Ceylon. I find gl. III to be always male, but being described as neuter by others it no doubt varies in this respect, as do so many other *Panica*. It is very near the American *P. molle*, Sw., and is often confounded with it, and the English names given above apply to both. It is distinguished from *P. molle* by the glabrous panicle and 1-nerved (not 3-nerved) gl. I.

11. **P. javanicum**, *Poir. Encycl. Suppl.* iv. t. 274; pubescent or hairy, leaf-base rounded or cordate, spikes 6–12, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in., biseriate alternate or upper scattered ovate acute, gl. I not = $\frac{1}{2}$ II 3-nerved, II 7-nerved acute, III like II 5-nerved paleate, IV oblong rugulose shortly abruptly awned. *Trin. Pan. Gen.* 155; *Baker Fl. Maurit.* 434. P. Helopus, *Trin. in Spreng. N. Entdeck.* ii. 84, *Pan. Gen.* 150, *Sp. Gram. Ic.* t. 183; *Nees Agrost. Bras.* 117; *Steud. Syn. Gram.* 7; *Duthie Grass. N.W. Ind.* 4, *Indig. Fodd. Grass.* t. 7, *Fodd. Grass. N. Ind.* 8 (*excl. some Syns.*); *Benth. Fl. Austral.* vii. 476 (*in note*). P. japonicum, *error for* javanicum, *Kunth Revis. Gram.* i. 205, *in syn.* P. hirsutum, *Koen. ex Roxb. Fl. Ind.* i. 300, & *Wight Cat.* n. 1620; *Aitchis. Cat. Panjab. Pl.* 159. P. Koenigii, *Spreng. Syst.* i. 311. P. papillosum, *Fenzl ex Steud. l. c.* 100. P. paspaloides, *Herb. Heyne, ex Wall. Cat.* n. 8729. P repens, *Herb. Roxb. ex Wall. l. c.* n. 8731 A (*non Fl. Ind.*). P. trichopus, *Hochst. in Flora*, xxvii. (1844) 254. Oplismenus? hirsutus, *Schult. Mant.* ii. 271. O. javanicus, *Roem. & Sch. Syst.* ii. 891. Helopus trichopus, *Hochst. ex Steud. l. c.* 100. Setaria? hirsuta, *Kunth Revis. Gram.* i. 47, *Enum. Pl.* i. 157. S. pilifera, *Spreng. Syst.* iv. *Cur. Post.* 33. Urochloa panicoides, *Beauv. Agrost.* 52, t. 11, f. 1; *Kunth l. c.* i. 205, t. 14, *Enum.* 74 (*excl. Syn. Roxb.*); *Schult.*

Mant. iii. 595. U. pubescens, *Kunth l. l. c.* 31, 74. U. mauritiana, *Bojer Hort. Maurit.* 363.—Panicum, *Sp. Wall. Cat.* n. 8729.

Plains of INDIA, from Kashmir to Bengal, and southward to CEYLON.—DISTRIB. Tropics generally.

Annual. *Stem* 1–2 ft., decumbent and rooting below, nodes pubescent. *Leaves* 1–5 by $\frac{1}{3}$–$\frac{2}{3}$ in., flat or undulate, very variable in breadth and form of base, lanceolate, acuminate and loose sheath laxly hairy; ligule a beard. *Spikes* $\frac{2}{3}$–2 in. long, secund, spreading; rachis 3-gonous, pubescent and with a few long hairs. *Spikelets* $\frac{1}{8}$ in., geminate or upper solitary, usually pubescent, pale; pedicels very short; gl. I acute or obtuse; III male, palea oblong; IV rounded at the tip.—Kunth (Revis. Gram. i. 206) says, under *Urochloa panicoides*, that he has examined in Desfontaine's Herbarium the type of Poiret's *P. javanicum*, and identified it, which he cites as a syn. of *Urochloa panicoides*, but his figure of which again quite accords with a narrow-leaved form of *P. Helopus*, Trin. This requires the adoption the name *javanicum* (by misprint *japonicum* in Kunth Revis.), for the species. Bentham, on the other hand (Fl. Austral. vii. 477), says that Munro has seen an authentic specimen of *javanicum*, and that it is quite distinct from *P. Helopus*. I have no means of verifying either authority.

12. **P. ramosum,** *Linn. Mant.* i. 29; suberect, glabrous or pubescent, leaves amplexicaul, spikes many often crowded suberect, rachis scabrid and hairy, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. 1–2-seriate elliptic ovoid or obovoid glabrous or pubescent, gl. I = $\frac{1}{2}$ III ovate 3–5-nerved margins overlapping, II 7-nerved, III 5–7-nerved neuter, palea narrow, IV subobovoid apiculate transversely rugulose. *Kunth Enum. Pl.* i. 125; *Steud. Syn. Gram.* 97; *Wall. Cat.* n. 8727 A. P. arvense, *Kunth Revis. Gram.* ii. 391, t. 109; *Enum. Pl.* i. 93; *Steud. l. c.* 67. P. aquariorum, Bansium & quinquangulare, *Ham. ex Wall. Cat.* n. 8727 C, 8725 A. B. P. canescens, *Wight Cat.* n. 1622 (*non Roth.*). P. fluitans, *Herb. Heyne ex Wall. Cat.* n. 8727 B. P. grossarium, *Koen. in Naturf.* xxiii. (1788) 205 (& *Heyne & Roxb. in Herb. Banks*). P. Kotschyanum, *Hochst. in Flora* xxv. (1842) *Beibl.* i. 33; *Steud. l. c.* 68. P. nudiglume, *Hochst. l. c.* xxvii. (1844) 33; *Steud. l. c.* P. Petiverii, *Trin. Diss.* ii. 144, *Pan. Gen.* 171, *Sp. Gram. Ic.* t. 176 A. B.; *Kunth Enum. Pl.* i. 91; *Nees Agrost. Bras.* 111; *Steud. l. c.*; *Wight Cat.* n. 1622, *Herb.* n. 1628, *in part*, & n. 3226; *Aitchis. Cat. Panjab Pl.* 160; *Duthie Grass. N.W. Ind.* 6, *Fodd. Grass. N. Ind.* 11; *Boiss. Fl. Orient.* v. 439. P. psilopodium, *Koen. ex Trin. Pan. Gen.* 217. P. semivertiicillatum, *Wight Cat.* n. 1125. P. umbrosum, *Retz. Obs.* iv. 16; *Roxb. Fl. Ind.* i. 297, *Ic. pict.* 103, 797.—Panicum, *Wall. Cat.* n. 8725 A. B. 8727 A. B. C. and D. *in part.*

Plains of INDIA, from Scind and the N.W. Provinces to Behar and southward to Madras.—DISTRIB. Affghan.

Annual? *Stem* 1–3 ft., decumbent and branched below; branches erect, leafy. *Leaves* 3–4 by $\frac{1}{4}$-1 in., lanceolate, acuminate, thin, glabrous or pubescent, base rounded and usually deeply lobed, margins minutely ciliolate; sheath glabrous or pubescent, mouth usually ciliate; ligule short. *Panicle* 2–6 in., inclined, oblong, glabrous or pubescent; rachis angular. *Spikes* 1–2 in., erecto-patent, rather distant, sometimes divided at the base. *Spikelets* alternate, close or distant, often in pairs a sessile and pedicelled, pale green or yellowish, turgid; pedicel usually with long cilia.—I think this is certainly *P. umbrosum*, Retz & Roxb.

13. **P. setigerum,** *Retz. Obs.* iv. 15; leaves ovate-lanceolate with long cilia towards the amplexicaul base margins below crenulately wrinkled, spikes alternate, pedicels with scattered long hairs, spikelets $\frac{1}{5}$ in. biseriate alternate imbricate subsessile ovate acuminate glabrous or pubescent, gl. I

= ⅔ III obtuse 3-nerved, II ovate-lanceolate acuminate 7-nerved, III 5-nerved neuter, palea as broad acuminate, IV broadly oblong mucronate or shortly awned finely rugulose. *Roxb. Fl. Ind.* i. 299; *Kunth Enum. Pl.* 90 (*excl. some Syns.*); *Herb. Ham. ex Wall. Cat.* n. 8730 B. P. affine, *Poir. Encycl. Suppl.* iv. 273 (*ex Kunth*). P. grossarium, *Roxb. Ic. Ined.* t. 798 (*not Fl. Ind.*). P. Helopus, *Trin.* (hirsutum, *Koen.*), *Wight Cat.* n. 1620. P. lanceolatum, *Herb. Heyne ex Wall. Cat.* n. 8730 A. P. nutans, *Herb. Rottl.* P. prostratum, forma major, *Thw. Enum. Pl. Zeyl.* 359. P. prostratum, *var.* horizontale, *Trim. Cat. Ceyl. Pl.* 105. P. repens, *Herb. Wight ex Wall. Cat.* n. 8730 C. P. subcordatum, *Herb. Wight ex Wall. Cat.* 8730 D. ? Oplismenus prostratus, *Edgew. in Journ. Linn. Soc.* vi. (1862) 195.—Panicum, *Wall. Cat.* n. 8727 D, *in part*, 8730.

BENGAL; common. The CONCAN and SOUTH DECCAN, *Rottler*, &c. CEYLON, *Thwaites* (C.P. 3236).

Stem 2–3 ft., slender, prostrate and widely straggling below; lower internodes long; nodes rooting, tomentose. *Leaves* 3–5 by ½–1¼ in., finely acuminate, flat, margins crispedly wrinkled below, or to beyond the middle; sheath with ciliate margins; ligule a few hairs. *Spikes* 3–6, suberect or spreading, rather distant; angles of rachis scaberulous. *Spikelets* solitary or geminate, suberect, very acuminate.—It is impossible to recognize this species from Retz's description, but the name attached to three different specimens in Rottler's Herbarium leaves little doubt as to his plant. Roxburgh describes *setigerum* as having the stem almost woody towards the base, which is hardly the case in the specimens I have seen. Edgeworth cites *P. setigerum*, Roxb., for his *Oplismenus prostratus*, but it may well be doubted if he knew Roxburgh's plant.

Var. *tomentosum*, leaves 6–7 in., margins and sheaths with very long hairs, spikelets larger ⅛ in. long tomentose, awn longer.

14. **P. distachyum,** *Linn. Mant.* i. 138; slender, quite glabrous, or panicle sparsely hairy, leaves linear or lanceolate base rounded, spikes 2–4 distant spreading, spikelets ⅛–⅙ in. solitary subsessile 1–2-seriate ellipsoid glabrous, gl. I = ½ II 5–7-nerved, II ovate acute 7-nerved, III 5-nerved, IV ellipsoid obscurely rugulose top rounded. *Retz. Obs.* iii. 17; *Lamk. Ill.* t. 43, f. 2; *Kunth Enum. Pl.* 91; *Steud. Syn. Gram.* 41; *Wight Cat.* n. 1612; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 104; *Aitchis. Cat. Panjab. Pl.* 159; *Duthie Grass. N.W. Ind.* 3, *Indig. Fodd. Grass.* t. 42, *Fodd. Grass. N. Ind.* 6; *Benth. Fl. Austral.* vii. 478. P. distachyon & marginatum, *Herb. Madr. ex Wall. Cat.* n. 8732 A. B. P. dimidiatum, *Heyne ex Wall. Cat.* n. 8732 D. P. subquadriparum, *Trin. Gram. Panic.* 145, *Sp. Gram. Ic.* t. 186; *Kunth l. c.* 80; *Steud. l. c.* 60. P. repens, *Herb. Roxb. ex Wall. l. c.* 8731 A. Digitaria distachya, *Pers. Syn.* i. 85.—Panicum, *Wall. Cat.* n. 8731, 8732.

Plains of INDIA, from the Panjab to Upper Assam and Burma, and southward to Malacca and CEYLON. GREAT COCOS Isld. (Ind. Ocean), *Prain.*—DISTRIB. China, Malaya, Australia.

Stems 1–2 ft., branched, straggling and creeping below. *Leaves* 2–6 by ⅛–¼ in., flat, margins of sheath ciliate or not, mouth hairy. *Spikes* 1–2½ in., rarely more than 4, erect, at length spreading; rachis slender, glabrous. *Spikelets* variable in size, pale green; gl. I with overlapping margins below; II paleate or not, palea if present narrow, neuter.

Var. *brevifolium*, Wight & Arn. in Wight Cat. n. 1612 a; leaves ⅓–1 in., ovate-lanceolate, spikes shorter, rachis broader, spikelets 2-seriate.—Drier places.

§§ *Spikelets more or less remote.*

15. **P. semiverticillatum,** *Rottler in Ainslie, Mat. Med. Hindost. Ed.* I. 219 (*name only*); stem stout erect branched, leaves broad base woolly, panicle large pubescent, spikes distant long alternate or whorled lax-fld., rachis slender, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. ovoid obtuse glabrous, gl. I much shorter than III very broad obtuse 5-nerved, II obtuse 7-nerved, III 5-nerved, palea narrow hyaline, IV ovate-oblong obtuse minutely granulate. *Steud. Syn. Gram.* 62. P. semiverticillatum, *Wight Cat.* n. 3050 ?, 3051. P. Petiverii, *Thw. Enum. Pl. Zeyl.* 359.

South Deccan, Coimbatore, *Rottler, Wight*; Anamallay Hills, *Beddome.* Ceylon, at Damboul, *Gardner* (C.P. 895).

Stem tall, erect, or base shortly decumbent; nodes and often internodes below them tomentose. *Leaves* 5–8 by $\frac{1}{3}$–$\frac{1}{2}$ in., linear-lanceolate, finely acuminate, flat, glabrous except at the narrow base; sheath tomentose above; ligule a tuft of wool. *Panicle* 4–8 in., subpyramidal; *Spikes* 1–2½ in.; rachis triquetrous, glabrous or pubescent. *Spikelets* pale, often solitary, upper shortly pedicelled.—Possibly a cult. form of *P. ramosum.* Described by Ainslie as a grain cultivated by the poor at Coimbatore and in other grain countries. I assume it to be Rottler's plant, relying on Wight, who had resided at Coimbatore. P. semiverticillatum, *Herb. Rottler*, from Jaffna in Ceylon is *P. colonum.*

16. **P. remotum,** *Retz. Obs.* iv. 17; very slender, leaves long narrow and sheaths quite glabrous, spikes few distant slender spreading, spikelets $\frac{1}{10}$ in. distant subsolitary ellipsoid obtuse glabrous, gl. I = $\frac{1}{3}$–$\frac{1}{2}$ III obtuse or subacute 3-nerved, II obtuse 5–7-nerved. III 5-nerved, palea narrow, IV elliptic obtuse minutely rugulose. *Kunth Enum. Pl.* i. 125; *Steud. Syn. Gram.* 68. P. grossarium, *Koen.* var. *Herb. Rottler.* P. Petiverii, *Trin. Sp. Gram. Ic.* t. 176, f. C. P. relaxatum, *Nees ex Steud. Nom. Ed.* II. ii. 262; *Wight Cat.* n. 1623 *a*, and *β* depauperatum.

Orissa, *Herb. Calcutt.* South Deccan, *Rottler*; Courtallam, *Wight*; Anamallay Hills, *Beddome.*

Stem 1–2 ft., much branched, decumbent, flaccid. *Leaves* 2–4 by $\frac{1}{4}$–$\frac{1}{3}$ in., finely acuminate, membranous, base quite glabrous; ligule very short, lacerate. *Spikes* 6–8, 2–4 in. long; rachis very slender, almost capillary, triquetrous, quite glabrous. *Spikelets* solitary or in distant pairs, sessile, or the upper long-pedicelled; glumes thin, pale with green nerves.—I find no difference between Nees' two vars. of *relaxatum.*

17. **P. Kurzii,** *Hook. f.*; slender, leaves short lanceolate base cordate, margins of sheaths ciliate, spikes few very slender naked or with few hairs, spikelets $\frac{1}{10}$ in. ovoid acute glabrous, gl. I = $\frac{1}{3}$–$\frac{1}{2}$ III 3–5-nerved, II ovate acuminate 7-nerved, III 5-nerved, palea broad, IV elliptic-oblong minutely rugulose, tip rounded apiculate.—Panicum, *Wall. Cat.* n. 8745.

Lower Bengal, *Wallich. Griffith*; Seebpore, *Kurz*; Vicrampore and Dacca, *Clarke.* Behar; top of Parusnath, *J. D. H.*

Annual, decumbent and rooting below, flaccid. *Leaves* 2–3 by $\frac{1}{3}$–$\frac{2}{3}$ in., acuminate, margins crisped towards the usually ciliate base; sheath with villous margins; ligule bearded. *Panicle* 2–6 in. long; spikes few, very distant, 2–3 in. long, with rarely a short branch bearing 2–3 spikelets towards the base of the lower. *Spikelets* pale, subsessile or pedicelled.—This Lower Bengal plant found at Seebpore close to the Calcutta Bot. Garden, should be one of Roxburgh's species, but I cannot identify it. It is very closely allied to *P. remotum* and altogether like that plant in habit, differing chiefly in the short leaves and the ciliate margins of the leaf-sheaths and in habitat. A doubtful specimen from Baidyanath (Santal Pergunnahs) collected by Clarke, has the narrow leaves of *remotum.*

18. **P. latifolium,** *Linn. Sp. Pl.* 58; stem prostrate and rooting below, leaves lanceolate acuminate base rounded or cordate, panicle lax, branches distant stout, rachis scaberulous, spikelets large $\frac{1}{7}$–$\frac{1}{5}$ in. very distant secund solitary or in pairs, glumes coriaceous 5-nerved, tips thickened, I = $\frac{1}{2}$ II or longer, II and III subequal, III broadest triandrous, palea narrow, IV ovoid acuminate quite smooth. *Willd. Sp. Pl.* i. 350; *Kunth Enum. Pl.* i. 117; *H. B. & K. Nov. Gen. & Sp.* i. 100. P. Balbisianum, *Schult. Mant.* ii. 254; *Steud. Syn. Gram.* 76. P. grandiflorum, *Trin. ex Nees Agrost. Bras.* 154. P. oryzoides, *Sw. Prodr.* 23, *Fl. Ind. Occ.* i. 161; *Kunth l. c.* 129; *Nees Agrost. Bras.* 154; *Steud. l. c.* 80; *Arduin. Animadv.* ii. t. 5; *Griseb. Fl. Brit. W. Ind.* 547. P. Pseudo-oryzoides, *Steud. l. c.* 75. P. Ridleyi, *Hack. in Trans. Linn. Soc. Ser.* II. *Bot.* iii. 401 (*name*). P. zizanioides, *H. B. K. l. c.*; *Steud. l. c.* 75.—Panicum, *Griff. Notul.* iii. 31, n. 17.—*Wall. Cat.* n. 8706.—Gram. Virgin. &c. *Moris. Hist. Pl.* iii. 196, t. 8, f. 4.—*Sloane Hist. Jam.* i. 114, t. 71, f. 3.

Bengal, Silhet, Cachar, Burma, and the Malay Penins.—Distrib. Eastern trop. Asia and America.

Stem 6–24 in., rather stout, extensively creeping, glabrous, or nodes tomentose. *Leaves* 1–6 by $\frac{1}{4}$–$\frac{3}{4}$ in., subdistichous, flat, glabrous; sheaths smooth; ligule short, ciliate. *Panicle* 1–6 in., erect, contracted; branches simple or sparingly divided, having short 3-fld. branchlets at the base; rachis stiff, angular. *Spikelets* turgid, very obscurely jointed on the short stiff pedicels, pale green; gls. all broadly ovate, their thickened tips laterally compressed, lateral nerves on each side close together; III empty or imperfectly triandrous.—The compressed thickened tips of the glumes are very characteristic.

Var. *majus*; stem stout 4–6 ft., internodes 4–6 in. rigid, nodes tomentose, leaves $\frac{3}{4}$ in. broad, margins thickened, base narrowed, panicle nearly 12 in. long.—Malay Peninsula, at Goping, *King's Collector.*

Sect. IV. Hymenachne. (See p. 27.)

19. **P. myurus,** *H. B. & K. Nov. Gen. & Sp.* i. 98 (*excl. Syn. Lamk.*); stem tall stout spongy below, leaves long flat base cordate, panicle narrow very compound often interrupted, branches closely appressed, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. erect narrowly lanceolate, gl. I = $\frac{1}{3}$ III, II 3-nerved, III much longer than II 3–5-nerved, IV small thin lanceolate. *Kunth Revis. Gram.* i. 33, *Enum. Pl.* i. 86, *Suppl.* 65; *Thw. Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 104; *Duthie Fodd. Grass. N. Ind.* 10 (*excl. Syn.*); *Benth. Fl. Austral.* vii. 480 (*excl. Syn. interruptum*)—*Excl. in all Syn. Lamk. Rudge, Richard, Trin.* P. acutiglumum, *Steud. Syn. Gram.* 66. P. auritum, *Hassk. Pl. Rar. Jav.* 22 (*non Presl.*). P. cynosuroides, *Herb. Rottl.* P. Hasskarlii, *Steud. in Zoll. Syst. Verz.* 54, *Syn. Gram.* 70; *Miq. Fl. Ind. Bat.* iii. 456. P. myurum, *Meyer Fl. Esseq.* 50 (*excl. Syn. Lamk & Rudge*). P. mangaloricum, *Steud. l. c.* 78. P. serratulum, *Herb. Ham. in Wall. Cat.* n. 8699. P. serrulatum, *Roxb. Fl. Ind.* i. 307; *Kunth Enum. Pl.* i. 126. Hymenachne myuros, *Beauv. Agrost.* 49, t. 10, f. 8 (*excl. Syn. Lam.*); *Nees Agrost. Bras.* 275; *Griseb. Fl. Brit. W. Ind.* 553 (*excl. Syn.*); *Steud. l.c.* Agrostis alopecuroides, *Vahl. mss.*, & A. monostachys, *Poir. Encycl. Suppl.* i. 256, *ex Kunth l. c.*—Panicum, *Wall. Cat.* n. 8699.

Marshes in Upper and Lower Bengal, Assam, Silhet, the Deccan, Malayan Peninsula and Ceylon.—Distrib. Trop. As. Austral. and Amer.

Stem erect, 2–6 ft., leafy, rooting at the nodes of the prostrate base, which is often as thick as a swan's quill. *Leaves* 12–18 by $\frac{3}{4}$–1 in., tapering from a broad cordate base to a fine point, margin serrulate; sheath smooth, glabrous; ligule very

short, rounded. *Panicle* 6–12 in., rarely 1 in. diam., often interrupted, sometimes quite cylindric. *Spikelets* erect, very shortly pedicelled, pale green; gl. I broadly ovate, acuminate; III tapering into a long rigid erect beak, palea 0 or imperfect.—Generally cited as *P. myurus*, of Lamk, but as Nees has pointed out (Agrost. Bras. l.c.) Lamk's plant is Richards' *P. myosurus* (= *P. indicum*). In Munro's herbarium *P. myurus* is, perhaps rightly, referred to *P. amplexicaule*, Rudge (Pl. Gui. i. 21), which is a much broader leaved plant.

20. **P. assamicum,** *Hook. f.*; slender, erect, leaves narrow base rounded, panicle spiciform cylindric very narrow interrupted, spikelets $\frac{1}{8}$ in. densely crowded on the appressed branches, gl. I = $\frac{1}{4}$ III 3-nerved, II and III lanceolate 5-nerved, III rather longer than II epaleate, IV ovate-lanceolate thin smooth.

Assam, *Masters, Griffith*; Dacca, *Clarke.*

Stem 12–18 in. or more, ascending, as thick as a sparrow's quill, lower nodes rooting. *Leaves* 2–4 in., narrowed from the base to the acute tip, margins quite smooth, involute (when dry); sheath glabrous or mouth slightly hairy; ligule a narrow membrane. *Panicle* 3 in., hardly $\frac{1}{4}$ in. diam., pale green, quite glabrous. *Spikelets* very shortly pedicelled; glumes thin.—I advance this species with hesitation. It is nearest to *P. myurus*, differing in size, narrow leaves, very narrow panicle, smaller spikelets, and shorter glume III.

21. **P. auritum,** *Presl ex Nees Agrost. Bras.* 176; tall, erect, leaves linear-lanceolate base broadly cordate, panicle long contracted or more or less effuse much fastigiately branched, branches erect, spikelets $\frac{1}{16}$–$\frac{1}{10}$ in. crowded on short branchlets solitary sessile or shortly pedicelled oblong or ovate-oblong subacute, gl. I = $\frac{1}{3}$ III obtuse or acute nerves 3–5 arching, II and III subequal acute or acuminate 5-nerved, III paleate neuter, IV lanceolate acuminate smooth. *Presl Rel. Hænk.* i. 305; *Trin. Pan. Gen.* 176; *Kunth Enum. Pl.* i. 113; *Steud. Syn. Gram.* 70; *Thw. Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 105; *Baker Fl. Maurit.* 437; *Miq. Fl. Ind. Bat.* iii. 456. P. insulicola, *Steud. l. c.* 73. P. javanum, *Nees & Bühse in Miq. Pl. Jungh.* 376; *Miq. Fl. Ind. Bat. l. c.* 453. P. maximum, *Wall. Cat.* n. 8715 F. P. patens, *Bojer Hort. Maurit. ex Baker l. c.* P. secundum, *Herb. Rottl.* Hymenachne myurus, *Herb. H.f. & T.* (*in part*).—Panicum, *Wall. Cat.* n. 8701, 8707.

Marshes from Bengal and the Concan to Burma, Travancore, the Malay Peninsula, and Ceylon.—Distrib. Malaya, China, Mauritius?

Perennial. *Stem* 3–6 ft., sometimes as stout as a goose-quill, soft. *Leaves* 8–14 by $\frac{3}{4}$–$1\frac{1}{4}$ in., glabrous or sparsely hairy beneath, as is the sheath; mouth villously bearded; ligule very narrow. *Panicle* 8–18 in., green, rachis scaberulous, branches 2–5 in., branchlets and fascicles of spikelets subsecund. *Spikelets* green, glabrous, nerves strong; gl. I broadly ovate; II and III ovate-oblong; palea of III small; IV as long as III, white, thinly coriaceous.—The Ceylon specimens have longer ($\frac{1}{10}$–$\frac{1}{8}$ in.) narrower and more acuminate spikelets than the normal.

22. **P. interruptum,** *Willd. Sp. Pl.* i. 341; stem tall very stout spongy below, leaves long flat base rounded or subcordate, panicle very narrow almost reduced to a spike, spikelets (many imperfect) $\frac{1}{6}$–$\frac{1}{5}$ in. fascicled very shortly pedicelled ovoid rather turgid, gl. I = $\frac{1}{3}$ III orbicular hyaline 5-nerved, II = III ovate-oblong obtuse strongly 9-nerved, III ovate-oblong obtuse, palea small, IV much smaller lanceolate acuminate polished white. *Nees Fl. Afr. Austr.* 51; *Kunth Enum. Pl.* i. 87; *Roxb. Fl. Ind.* i. 286; *Wall. Cat.* n. 8695 *Excl.C.*; *Thw. Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 104; *Wight Cat.* n. 1640; *Griff. Notul.* iii. 26, *Ic. Pl. Asiat.*

t. 139, f. 221 & t. 146, f. 2.; *Dalz. & Gibs. Bomb. Fl.* 316. P. caudatum, *Thunb. Fl. Cap.* i. 393. P. inundatum, *Kunth Revis. Gram.* i. 34; *Enum. Pl.* i. 88. P. spiciforme, *Hochst ex A. Rich. Tent. Fl. Abyss.* ii. 359. P. stagninum, *Herb. Ham. ex Wall. Cat. n.* 8695 D (*non Retz*). P. turritum, *Thunb. in Mus. Nat. Acad. Upsal.* x. 148. P. uliginosum, *Roth Nov. Pl. Sp.* 50. Hymenachne interrupta, *Bühse in Miq. Pl. Jungh.* i. 377; *Miq. Fl. Ind. Bat.* iii. 458; *Steud. l. c.* 101.

Swamps; from the UPPER GANGETIC PLAIN to ASSAM and BURMA, and southward to CEYLON—DISTRIB. China, Malaya, Afr. trop.

Stem 3–5 ft., lower internodes often as thick as the thumb, rooting. *Leaves* 6–12 by ¼–½ in., many-nerved, base hardly contracted; sheath smooth; ligule short, membranous. *Spike* 6–10 in. by ⅛ in. diam., strict; rachis stout, terete, channelled. *Spikelets* spreading, much longer than their pedicels, green, herbaceous.—Very near the American *P. vilfoides*, Trin. (*fluviatile*, Nees). Bentham reduces *P. interruptum* to *P. myurus*, but they are very different plants.

23. **P. indicum,** *Linn. Mant.* ii. 184; stem slender, leaves linear glabrous or hirsute base narrow, panicle spiciform oblong or cylindric dense fld. branches very short, spikelets longer than their pedicel $\frac{1}{10}$–$\frac{1}{8}$ in. crowded ovoid or oblong subacute straight or curved glabrous or hispid, gl. 1 = about ⅓ III 3-nerved, II ovoid cymbiform obtuse or subacute 7–9-nerved, III as long as II oblong obtuse 7–9-nerved, palea minute, IV minute ovoid subacute. *Retz. Obs.* iii. 9; *Kunth Enum. Pl.* i. 133; *Steud. Syn. Gram.* 84; *Trin. Diss.* ii. 170, *Pan. Gen.* 84, *Sp. Gram. Ic.* 197; *Roxb. Fl. Ind.* i. 285; *Thw. Enum. Pl. Zeyl.* 361 (*excl.* CP. 909); *Trim. Cat. Ceyl. Pl.* 104; *Benth. Fl. Hongk.* 413, *Fl. Austral.* vii. 480; *Franch. & Sav. En. Pl. Jap.* ii. 163. P. angustum, *Trin. Sp. Gram. Ic.* t. 334; *Wight Cat.* n. 1642; *Steud. l. c.* P. arcuatum, *Br. Prodr.* 189; *Kunth l. c.* 77; *Griff. Notul.* iii. 39, 40, *Ic. Pl. Asiat.* t. 147, f. 1; *Duthie Grass. N.W. Ind.* 5, *Fodd. Grass N. Ind.* 9. P. contractum, *Wight & Arn. ex Nees in Herb. Wight*; *Steud. l. c.* 84. P. conglomeratum, *Herb. Rottl.*; ? *Linn. Mant.* 324; *Kunth l. c.* 133. P. interruptum, *Wall. Cat.* n. 8695 *C. partim.* P. Johannæ & incurvum, *Herb. Linn. ex Munro in Journ. Linn. Soc.* vi. 39. P. microstachyum, *Lamk. Ill.* i. 170, *Encycl.* iv. 739; *Kunth l. c.* 88. P. myosurus, *Rich. in Act. Soc. Hist. Nat. Par.* i. (1792) 106. P. myurus, *Lamk. Ill.* i. 172. P. phalaroides, *Roem. & Sch. Syst.* ii. 452. P. phleoides, *Br. ex Kunth l. c.* Hymenachne indica, *Bühse ex Miq. Fl. Ind. Bat.* iii. 458. H.? phalaroides, *Nees Agrost.* 276; *Steud. l. c.* 202. ?Aira indica, *Linn. Sp. Pl. Ed.* 2. 94. Panicum, *Wall. Cat.* n. 8696 B. C. (*in part*) D. E. F. (*in part*) G. H., 8697, & 8698.

Tropical and subtropical INDIA (ascending 6000 ft. in the Himalaya) from Garwhal eastwards and southwards. CEYLON.—DISTRIB. Trop. Asia and Australia. (Mexico, an alien).

P. indicum appears to pass insensibly into *P. interruptum* and *P. myosuroides*, the former of which differs in its stouter habit, the latter in its caudiform spike and more minute rounded spikelets. Though so abundant in the Plains to the eastward of the Jumna, I have seen no specimens from the west of that river; nor from Africa. The following are the principal Indian forms, in describing which I have used the word spike in a conventional sense.

Var. *indicum proper*; stem 6–18 in. erect or decumbent at the base, leaves narrow, spikes ¼–2 in. cylindric green whitish or blue-purple, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. ovate-lanceolate acute straight or decurved glabrous or sparsely setose.—The common Plains form. *P. phalaroides*, Roem. & Sch. is a common state with more setose spikelets; it is *P. indicum*, β, Wight Cat. 1641 B.

Var. *elatum*; glabrous, stem 3–4 ft. stout erect, leaves 6–10 in. by $\frac{1}{3}$ in., spike 3–6 in. rather stout, spikelets $\frac{1}{6}$ in. erect oblong-ovate acute violet blue rarely greenish.—Khasia hills, in wet places alt. 5–6000 ft. The nearest form to *P. interruptum*.

Var. *pilosum*; like var. *elatum*, but not so tall, more flaccid, leaves hirsute with spreading hairs.—Khasia hills, alt. 4–5000 ft.

Var. *villosum*; softly silkily villous, stem 1–2 ft., leaves quite erect, spike 2–6 in., spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. green or purplish ovate-oblong glabrous.—Panicum, No. 39, *Herb. Ind. Or. Hook. f. & T.*—Khasia hills, alt. 5–6000 ft.

Var. *gracile*; stem 1–2 ft. very slender simple or branched, leaves 4–6 by $\frac{1}{6}$–$\frac{1}{3}$ in. flaccid, spikes 2–4 in. pale, spikelets $\frac{1}{6}$ in. ovoid subacute glabrous spreading.—Nepal, Kumaon, Sikkim, &c.

Var. *angustum*; whole plant very slender spike of very minute loosely packed spikelets $\frac{1}{10}$ in. long.—This, the *P. angustum* Trin., is a starved form.

Var. *turgidum*; stem 6–12 in., spike short cylindric or oblong very pale often proliferous, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. oblong turgid setulose.—Panicum, *Wall. Cat.* n. 8697, 8698.—In wet places. Perhaps a diseased form.

24. **P. myosuroides,** *Br. Prodr.* 189; slender, leaves narrow, spikelets innumerable $\frac{1}{16}$–$\frac{1}{12}$ in. densely crowded in an elongate cylindric curved caudiform panicle broadly obovoid or subglobose obtuse, gl. I about $\frac{1}{3}$ III 3-nerved, II very convex and III 5–7-nerved, III oblong obtuse palea minute, IV minute ovate-oblong. *Kunth Enum. Pl.* i. 77; *Steud. Syn. Gram.* 56; *Benth. Fl. Austral.* vii. 480 (*excl. syn. angustum*); *Duthie Fodd. Grass. N. Ind.* 11. P. arcuatum, *Wight Cat.* n. 1639 (*non Br.*). P. angustum, *Wight l. c.* 1642 (*non Trin.*); *Wight Cat.* n. 164. P. curvatum, *Roxb. Fl. Ind.* i. 286 (*non Linn.*); *Kunth l. c.* 87 (*excl. syn.*). P. indicum, *Herb. Wight* n. 3042; *Thw. Enum. Pl. Zeyl.* 361 (*in part*). P. interruptum, *var.* contigua. *Steud. in Pl. Ind. Or. Hohen.* n. 1606 (*non Willd.*). P. multiflorum, *Roxb. Ic. Pict. ined.* t. 782. P. nervosum, *Herb. Heyne ex Wall. Cat.* n. 8696 A.—Panicum, *Wall. Cat.* n. 8696 A. C. F. (*in part*) G.—Sporobolus, *Wall. Cat.* n. 3766 *ex Wight. Cat.* n. 1642.

Throughout the hotter parts of India from NEPAL eastward to ASSAM and BURMA, and southward to the MALAY PENINSULA and CEYLON.—DISTRIB. China, Austral. Afric. trop.

Stem erect or shortly creeping. *Leaves* rarely $\frac{1}{4}$ in. broad. *Spiciform* or rather caudiform panicle sometimes 8 inches long, tapering from base to tip, with rarely a short branch abruptly breaking out from near the base. *Spikelets* longer than their pedicels, green or purplish.—This is unquestionably *P. myosuroides*, Br., and Roxburgh's *P. curvatum*, but I hesitate to cite all the authors who have taken up these names, in some cases probably from forms of *P. indicum*. In its ordinary state it is a very distinct grass, from its elegant tail-like inflorescence and minute obtuse spikelets, but I find it impossible to separate specimens with short spikes from states of *P. indicum*. *P. angustum*, Trin., is such a state, and is referred to *myosuroides* by Bentham, but its larger spikelets are rather those of true *indicum*.

25. **P. curvatum,** *Linn. Syst. Nat.* xii. 730; stem very slender, and narrow leaves flaccid, spikelets in a lax panicle with capillary flexuous branches, spikelets gibbously ovoid-oblong decurved, nerves very strong, gl. I minute, II cymbiform or almost galeate, III shorter than II ovate, palea linear-oblong, IV minute. *Wight Cat.* n. 1636; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Nees Agrost. Bras.* 207, *Fl. Afr. Austr.* 50. P. costulatum, *Bojer, mss.* P. coryophorum, *Kunth Revis. Gram.* 93, t. 107; *Enum. Pl.* 88; *Suppl.* 66.—Panicum, *Wall. Cat.* n. 8742.

SOUTH DECCAN PENINSULA; *Heyne*, &c., Courtallam, *Wight*. CEYLON, *Walker*, *Thwaites*.—DISTRIB. Madagascar, S. Africa.

Stem 6–18 in., prostrate, much branched, remotely leafy, nodes glabrous. *Leaves* 2–3 by $\frac{1}{6}$ in., flat, sometimes sparsely hairy; sheath long, slender; ligule hardly any. *Panicle* 1–4 in., branches alternate, quite glabrous. *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in., very strongly nerved, except gl. I, which is transversely oblong; II very strongly 11-nerved; III 3–5-nerved; IV ovoid, obtuse.—A very elegant small grass. Steudel (Syn. Gram. 85) has referred Sprengel's *P. madagascarense* (Syst. i. 317) to this, but Sprengel's character "glumes obsoletely nerved" is irreconcilable.

Sect. V. BREVIGLUMÆ. (See p 27.)

26. **P. canaliculatum,** *Nees in Wight Cat.* n. 1624; stems very slender flaccid branched, leaves narrow, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. solitary or few together clustered on distant very short branchlets along a capillary simple rachis ovate-oblong very shortly pedicelled, gls. membranous, I and II not = $\frac{1}{2}$ III broadly ovate subequal, III ovate acute paleate male, IV as long as III lanceolate acuminate thin muriculate tip minutely 2-toothed and mucronulate. *Steud. Syn. Gram.* 55. P. myurum, *Wight ex Steud. l. c.* P. stenostachyum, *Thw. Enum. Pl. Zeyl.* 436; *Trim. Cat. Pl. Ceyl.* 105. Aira interrupta, *Rottl. ex Steud. Syn. Gram.* 55.

Southern DECCAN PENINSULA, *Wight*. CEYLON; Jaffna, *Herb. Rottler*; Trincomalee, *Glenie*.

Quite glabrous. *Stems* 2–3 ft., many from a small woody branched nodulose rootstock, erect or decumbent at the base. *Leaves* 3–10 by $\frac{1}{8}$–$\frac{1}{6}$ in., thin, flat, quite smooth, nerves very slender, tips setaceous, base narrow; sheaths smooth; ligule obscure, ciliate. *Spike* 3–8 in., almost capillary. *Spikelets* solitary, binate, or in clusters of 3–6, on a very short branch, sessile or subsessile, pale, glistening; gl. I and II very broadly ovate, acute or obtuse; I 3-nerved; II rather the longest, 5-nerved; III faintly 5–7-nerved, its palea large, obtuse with broadly inflexed margins and green nerves at the smooth angles, which are faintly produced at the tips; IV very pale, dorsally flattened and channelled, 5-nerved; palea acute. *Lodicules* quadrately cuneate. *Anthers* linear. *Style* long, stigma short.—A very peculiar species.

27. **P. nodosum,** *Kunth Enum. Pl.* i. 97; stem creeping and rooting below, leaves linear base rounded or cordate, panicle broad rachis very slender scaberulous, branches very long filiform striate bearing remote racemose or solitary spikes of few secund elliptic-oblong acute spikelets $\frac{1}{12}$–$\frac{1}{4}$ in. long, gl. I not = $\frac{1}{2}$ III 3–5-nerved, II rather longer than I 5-nerved, III 5–7-nerved epaleate, IV elliptic-lanceolate acute thin smooth. *Steud. Syn. Gram.* 59; *Benth. Fl. Hongk.* 412; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105. P. Arnottianum, *Nees in Wight Cat.* n. 1611, *Herb.* n. 3068; *Steud. l. c.* P. multinode, *Presl Rel. Hænk.* i. 303 (*non Lamk.*). P. violaceum, *Llanos Fragm.* 42.

BENGAL, ASSAM, and southwards to MALACCA, TRAVANCORE and CEYLON.—DISTRIB. Malaya, China.

Stems 1–2 ft., slender, leafy. *Leaves* 2–5 by $\frac{1}{3}$–$\frac{1}{2}$ in., flat, thin, and as well as their sheaths glabrous pilose or hirsute, base ciliate; ligule very short. *Panicle* 4–6 in., branches 2–3 in., solitary or fascicled. *Spikelets* pale green, sessile or very shortly pedicelled, glabrous or slightly hairy; gl. IV. as long as III, dorsally flattened.

Sect. VI. EFFUSÆ. (See p. 27.)

* Gl. I as long as III or nearly so. (The three following species are in no way allied.)

28. **P. æquiglume,** *Hook. f.*; slender, leaves linear-lanceolate base narrow, panicle ovate lax, branches lax in alternate fascicles or whorls spreading laxly few-fld. and branchlets and pedicels capillary smooth, spikelets $\frac{1}{12}$ in. solitary oblong obtuse faintly nerved, I = III oblong obtuse white nearly flat faintly 5-nerved deciduous, II broadly ovate subacute 9-nerved convex, III shorter than II oblong paleate male or neuter nerveless, IV much shorter than II stipitate broadly ovate obtuse sparsely pilose above or glabrous white.

NILGHIRI HILLS; Goodadoor Ghats, alt. 5000 ft., in a wood, *Lawson.*

Stem 1–2 ft., apparently geniculately ascending, smooth, purplish; nodes glabrous. *Leaves* 2–3 by $\frac{1}{3}$–$\frac{1}{2}$ in., flat, green, smooth, 5–7-nerved and striate, midrib slender; base rounded or narrowly cordate; sheath purple, margin fimbriately ciliate; ligule a row of hairs. *Panicle* 4 in., branches in 6–8 rather distant fascicles of two or three, lowest $2\frac{1}{2}$ in. long. *Spikelets* very pale; gl. I very deciduous (so that the mature spikelet appears 3-glumed), but leaving a distinct scar; II more coriaceous, nerves more distinct; III and its palea sometimes very small and empty.—A very curious grass.

29. **P. ovalifolium,** *Poir. Encycl. Suppl.* iv. 279; stem slender decumbent and rooting below, leaves 1–2 in. ovate acuminate amplexicaul, panicle ovoid excessively branched, rachis branches and pedicels capillary, spikelets solitary $\frac{1}{16}$–$\frac{1}{10}$ in. ovate subacute, gl. I. nearly = III, II hemispheric pubescent or hirsute 5-nerved, III flat obtuse, palea large, IV oblong acute dorsally rounded smooth, margins narrowly inflexed. *Beauv. Fl. Owar.* ii. 79, t. 110, f. 1; *Kunth Enum. Pl.* i. 113; *Steud. Syn. Gram.* 84; *Benth. Fl. Hongk.* 413; *Thw. Enum. Pl. Zeyl.* 359; *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 6. P. amplexicaule, *Poir.* (*teste Beauv.*) *ex Kunth l. c.* P. arborescens, *Linn. Sp. Pl.* 59 (*in part*) (*cf. Trim. in Journ. Linn. Soc.* xxiv. 135). P. brevifolium, *Roxb. Fl. Ind.* i. 306, *& Herb. Linn.* P. guineense, *Desv. mss. ex Poir, Encycl. Suppl.* iv. 279. P. tricarinatum, *Steud. Nom. Ed.* II ii. 264, *Syn. Gram.* 94. Isachne tricarinata, *Roth Nov. Sp.* 57; *Kunth Enum. Pl.* i. 136.—Panicum, *Wall. Cat.* 8737.

SIKKIM HIMALAYA, alt. 4000 ft.; KHASIA HILLS, alt. 2000 ft.; MUNNEPORE, BURMA, the MALAY PENINSULA and CEYLON.—DISTRIB. Malaya, China, trop. Afr.

Stem geniculate and ascending below, leafy usually up to the panicle. *Leaves* membranous and sheaths glabrous ciliate or hairy above or all over; ligule very short, ciliate. *Panicle* ovoid. *Spikelets* variable in size; gl. II very persistent.—Resembles *Sphærocaryum elegans* and often mixed with it in Herbaria. As Trimen has pointed out (*Journ. Linn. Soc. l. c.*) this, according to *Herb. Linn. & Fl. Zeyl.* is *P. arborescens,* Linn., described as being as high as the loftiest trees. This error has no doubt originated from its having been accidentally assorted with an *Arundinaria* in Herb. Linn.

30. **P. turgidum,** *Forsk. Fl. Æg. Arab.* 18; shrubby, rootstock very stout creeping, stem woody, branches alternately or proliferously fascicled at the sheathed nodes, leaves short rigid, panicle erect glabrous branches solitary distant simple or sparingly divided, spikelets solitary $\frac{1}{10}$–$\frac{1}{8}$ in. subglobose pale, gls. coriaceous cymbiform, I = III or nearly so orbicular 5–7-nerved, II broadly ovate acute 7-nerved, III acumi-

nate 9-nerved paleate male, IV small ovoid acute quite smooth polished. *Del. Fl. Ægypt. Ill.* 51, t. 9, f. 2; *Nees Agrost. Bras.* i. 172 (*in note*); *Trin. Pan. Gen.* 221, *Sp. Gram. Ic.* t. 227; *Kunth Enum. Pl.* i. 97; *Steud. Syn. Gram.* 88; *Duthie Fodd. Grass. N. Ind.* 13.

SIND and CENTRAL INDIA, *Duthie l. c.*—DISTRIB. Beluchistan and westward to Egypt.

Rootstock sometimes as thick as the little finger, root fibres strong woolly; branches 2–4 ft., hard, solid, smooth, sometimes as thick as a goose-quill, clothed at the base with imbricating scarious scales, and the nodes higher up with long scarious leaf sheaths, branches sometimes forming dense subglobose fascicles at the nodes 2–3 in. diam., with many short reduced panicles. *Leaves* at the base of the stem 2–3 in. long, flat, coriaceous linear-lanceolate, acuminate, smooth, at the upper nodes reduced to brown chartaceous open sheaths with a deciduous setiform blade, ligule a row of short hairs. *Panicles* very variable, 1–5 in. long; rachis and branches slender, subscaberulous; pedicels short, tips cupular. *Spikelets* subsecund, young ovate-lanceolate acute, mature turgid; palea of gl. III broad with ciliate keels; of IV coriaceous like the gl. and shining. *Anthers* purple. *Styles* short, stigmas short, primrose-purple. — A remarkable grass, intermediate between *Brachiaria* and *Effusæ* allied to no other Indian, with something of the habit of *Spinifex*. Duthie is my authority for the Indian habitats of this fine species; that of Sind is natural, the Central Indian I doubt exceedingly. As a species it is unmistakable. I should be disposed to refer it to the *Brachiaria* section, but Trinius places it under his section *Miliaria*, which answers to *Effusæ*.

** Gl. I much shorter than III.

† Annual erect leafy grasses.

31. **P. miliaceum,** *Linn. Sp. Pl.* 58; leaves linear acuminate and sheaths clothed with long spreading hairs, base not cordate, panicle thyrsiform usually decurved or nodding, branches long slender suberect, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. ovate-oblong cuspidately acuminate glabrous, glumes channelled between the nerves I = $\frac{2}{3}$ III 5–7-nerved, II and III subequal 7–11-nerved, III paleate neuter, IV broadly ovate turgid 3–5-nerved polished. *Host Gram. Austr.* ii. 16, t. 20; *Kunth Enum. Pl.* i. 104, *Suppl.* 81; *Trin. Diss.* ii. 186, *Pan. Gen.* 194, *Sp. Gram. Ic.* t. 221; *Steud. Syn. Gram.* 77; *Reichb. Ic. Fl. Germ.* t. 82; *Roxb. Fl. Ind.* i. 310; *Wall. Cat.* n. 8716; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab. Pl.* 158; *Duthie Grass. N.W. Ind.* 5, *Field & Gard. Crops.* t. 23, *Fodd. Grass. N. Ind.* 9; *Franch. & Sav. En. Pl. Jap.* 165. P. asperrimum, *Fisch. Cat. Hort. Gorenk. ex Jacq. Eclog. Gram.* 46, t. 31; *Nees Agrost. Bras.* 199; *A. Rich Tent. Fl. Abyss.* ii. 374; *Steud. l. c.* P. callosum, *Hochst. ex A. Rich l. c.* P. densepilosum, *Steud. l. c.* 72, *ex Miq. Prolus Fl. Jap.* 275. P. Milium, *Pers. Syn.* i. 83. P. pilosum, *Herb. Roxb. & Herb. Heyne ex Wall. Cat. l. c.* P. striatum, *Spreng. Syst.* i. 318. Milium esculentum, *Moench Meth.* 203. M. Panicum, *Mill. Gard. Dict. Ed.* 8, n. 1.

Cultivated or naturalized (Wild ?) throughout the hotter parts of INDIA, AFRICA, and other hot countries.

Annual; stems tufted, 2–4 ft., stout, branching, leafy up to the panicle, often as thick as the little finger below. *Leaves* 6–12 by $\frac{1}{2}$–1 in., glabrous ciliate or hirsute, base narrow, margin scabrid often ciliate; sheaths lax, deeply grooved, clothed with very long spreading or reflexed hairs; ligule of long hairs. *Panicle* 6–12 in., branches filiform, fascicled, densely crowded, scaberulous; pedicels often much longer than the spikelets, but sometimes much shorter. *Spikelets* green, erect, turgid; gl. IV pale, sometimes dorsally 5-streaked.—Closely allied to *P. miliare* and *P. psilopodium* with which it possibly hybridizes, but with much larger spikelets. I am

far from satisfied that I have not erred in the synonyms cited for these three species, which are almost inextricably mixed. For a learned discussion on the Millet, the cultivation of which in Europe dates from prehistoric times, see A. de Candolle's "Origine de Plantes Cultivés," p. 302. Munro has attached the following to a specimen from Bombay (Woodrow, No. 89), "I believe this to be an uncultivated form of *P. miliaceum*"—it has spinulosely toothed scabrid leaves, and a perfectly erect panicle with very long erect branches, and few spikelets.

32. **P. miliare,** *Lamk. Ill. Gen.* 173; leaves linear hairy base rounded, panicle contracted or thyrsiform much branched erect or nodding, branches slender erect alternate, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. solitary or geminate usually shorter than their pedicels turgidly ovoid or ellipsoid acute, gl. I = $\frac{1}{3}$ III broadly ovate acute 3–5-nerved, nerves arching, II ovate-lanceolate 11–13-nerved, III 9-nerved paleate neuter, IV from oblong to broadly ovate acute shining often 3–5-streaked dorsally. *Rottl. in Neue Schrift. Ges. Naturf. Berol.* iv. (1803) 83: *Roxb. Fl. Ind.* i. 309; *Wall. Cat.* 8712 C. *in part*, F. G. H. I.; *Wight Cat.* n. 1629; *Kunth Enum. Pl.* i. 104; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab Pl.* 159; *Nees Fl. Afr. Austr.* 40; *Duthie Grass. N. W. Ind.* 5, *Field. & Gard. Crops.* 7, t. 26, *Indig. Fodd. Grass.* t. 46, *Fodd. Grass. N. Ind.* 10. P. attenuatum, *Willd. Enum. Hort. Berol.* 1033; *Nees Agrost. Bras.* 173; *Trin. Diss.* ii. 226. P. brevifolium, *Balb. ex Nees Fl. Afr. Austr.* 40. P. Menieri, *Koen. ex Nees l. c.* P. miliaceum, *Thw. Enum. Pl. Zeyl.* 360. P. miliaceum, var. *Rottl. in Neue Schrift. l. c.* P. musciparum, *Herb. Linn. ex Munro in Journ. Linn. Soc.* vi. (1862) 39. P. psilopodium, *Wight Cat.* n. 1633a. P. simplex, *Rottl. ex Trin. Gram. Panic.* 216; *Steud. Syn. Gram.* 67. P. sumatrense, *Roth Nov. Sp.* 50; *Kunth l. c.*—Panicum, *Wall. Cat.* n. 8718 B, 8720.

Cultivated or naturalized (or native ?) throughout INDIA and CEYLON.—DISTRIB. Tropics cult.

Annual. *Stem* 1–3 ft., rather slender, erect or base geniculate, simple or branched, usually leafy up to the panicle. *Leaves* 1–2 ft. by $\frac{1}{2}$–1 in., flat, and sheaths rarely hirsute with tubercle-based hairs, acute or acuminate; ligule a narrow row of hairs. *Panicle* 2–10 in., lower branches long, pedicels of spikelets sometimes $\frac{1}{2}$ in. *Spikelets* glabrous, rather flattened, usually green or purplish; gl. I variable, white, membranous, margins overlapping at the base, nerves arching and anastomosing; II and III herbaceous; palea of III as long as its gl.—If I remember aright *P. miliare* was conjectured by Munro to be a cultivated form of *P. psilopodium*; and except in the greater size, more contracted panicle, rather larger spikelets and usually shorter pedicels of *P. miliare* I fail to find characters whereby to separate them, and these are not very reliable. In its common state the grain of *miliare* is broader than in any form of *psilopodium* and much darker colrd. *P. simplex*, Rottl. is a weak flaccid form from Tranquebar, growing in shade. Trinius distinguishes it from *P. psilopodium*, by the scabrid pedicels of the spikelets, but they are quite glabrous in Rottler's specimen of *simplex*. I am not at all satisfied that I have rightly identified the synonymy of this and *P. psilopodium*.

Var. *hirtum*; upper leaf-sheaths with long spreading hairs. P. hirtum, *Wall. mss. in Herb. Linn. Soc.* Panicum, *Wall. Cat.* n. 8718 (*in part*).—Burma, *Wallich.*—Wallich's sheet has three different looking plants; viz. 8718 A, from Malloon, with the panicle of *psilopodium*, and hirsute sheaths; B from the banks of the Irawaddy with hirsute sheaths and the panicle of *miliare*; along with these is a plant with a similar panicle to the last but with glabrous sheaths.

33. **P. psilopodium,** *Trin. Gram. Panic.* 217; leaves narrow glabrous base rounded, panicle effuse branches capillary at length spreading, spikelets $\frac{1}{12}$–$\frac{1}{8}$ in. geminate ovate-lanceolate acute, pedicels capillary usually

longer than the spikelets, gl. I = ½ III or less broader than long 3–5-nerved tip obtuse or rounded, II ovate acuminate 11-nerved, III as long as II 9-nerved paleate neuter, IV oblong obtuse apiculate. *Nees Agrost. Bras.* 199; *Kunth Enum. Pl.* i. 100; *Steud. Syn. Gram.* 83; *Thwaites Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab. Pl.* 161; *Duthie Grass. N.W. Ind.* 6, *Field & Gard. Crops.* i. t. 23, *Fodd. Grass. N. Ind.* 10 (*in note*). P. Chintaman, *Herb. Ham. ex Wall. Cat.* 8712 D. P. glabrum, *Herb. Heyne ex Wall. Cat.* n. 8712 C (*in part*). P. miliare, *var.* Meneri, *Herb. Madr. ex Wall. Cat.* n. 8712 B. P. miliare, *Wall. Cat.* n. 8712 A (*in part*) B (*in part*) D. P. mucronatum, *Wall. Cat.* n. 8717 (*in part*). P. ramosum, *Koen. ex Herb. Banks.* P. Royleanum, *Nees ex Duthie Grass. N.W. Ind.* 6. P. virgatum, *Roxb. mss. ex Steud. Nom. Ed.* II ii. 265.—Isachne, *Wall. Cat.* 8659 B (*in part*).

Hotter parts of INDIA, ascending to 4000 ft., BURMA, MALACCA and CEYLON.

Annual. *Stem* 1–2 ft., rather slender, simple or branched, usually leafy up to the panicle. *Leaves* 3–12 by ⅛–⅓ in., flat, acute or acuminate, usually glabrous; sheaths glabrous or hirsute, mouth with a few hairs; ligule a narrow row of hairs. *Panicle* 2–8 in.; lower branches long; pedicels sometimes ½ in. long. *Spikelets* rather flattened, dorsally green or purplish; gl. I variable, membranous, white, margins overlapping at the base, nerves 3–5 anastomosing; II and III herbaceous, palea of III as long as the gl.; IV shining—Nees (Agrost. Bras.) describes gl. II as 7-nerved probably by error. Diseased states occur with gl. IV enlarged exserted flattened. Trinius describes the spikelets as elliptic and mucronate, and the panicle as contracted below and lax above, but this latter is a matter of development. Trinius gives as a character of *P. psilopodium* glumes open, which is a conspicuous one in *P. trypheron*, but I do not recognize it in this. He further says that he has seen this species in Herb. Lindley under the names of *P. ramosum*, Koen. and *P. virgatum*, Roxb. I have in vain tried to verify this in Lindley's Herb., and conclude that for Herb. Lindley Herb. Mus. Brit. is intended. Duthie, Fodd. Grass. N. Ind. 10 (*in note*) says that he is unable to distinguish *P. psilopodium* from *P. miliare*. Dr. Stapf, who has carefully reviewed a multitude of specimens of *P. miliare* and *psilopodium*, is disposed to think them separable, though the former is probably a cult. form of the latter. The true *psilopodium* he thinks has nearly always glabrous leaves, smaller spikelets and a shorter gl. I.

Var. *coloratum*; panicle violet or purple.—Simla and Garwhal, up to 6000 ft., Mt. Abu, *Duthie*; Shan Hills, Burma, *Collett*.

34. **P. trypheron,** *Schult. Mant.* ii. 244; leaves narrow, panicle effuse, branches long stiff filiform divaricate scaberulous, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. often geminate, pedicels capillary, gls. divergent strongly nerved I, II and III broadly ovate, I = ½ III or longer acuminate 5-nerved, II and III subequal recurved subcuspidate 9-nerved, III paleate neuter, IV broadly oblong obtuse shining often 5-nerved. P. coloratum, β hirsutum, *Nees in Herb. Lindl.* (*ex Steud.*). P. confine, *Hochst. in Schimp. Pl. Abyss.* n. 1230; *A. Rich. Tent. Fl. Abyss.* ii. 373; *Steud. Syn. Gram.* 72. P. jumentorum, *A. Rich. l. c.* 373 (*non Pers.*). P. miliare, *Wall. Cat* n. 8712 A (*in part*) E. P. miliare, β simplex, *Herb. Royle.* P. mucronatum, *Heyne in Wall. Cat.* n. 8717 (*in part*). ?P. notatum, *Duthie Grass. N.W. Ind.* 6. P. Neesianum, *Wight & Arn. ex Steud. l. c.* 74. P. porphyrrhizos, *Steud. l. c.* P. rigidum, *Herb. Heyne ex Wall. Cat* n. 8714 A (*in part*). P. Roxburghii, *Spreng. Syst.* i. 320; *Kunth Enum. Pl.* i. 126; *Steud. l. c.* 98. P. tenellum, *Roxb. Fl. Ind.* i. 306; *Duthie l.c.* 7.—Panicum, *Wall. Cat.* n. 8713, 8714 A (*in part*).

The PANJAB and GANGETIC PLAIN to CHITTAGONG and southward to MADRAS. KUMAON, up to 5000 ft.—DISTRIB. China, Borneo, Afr. trop.

Annual. *Stem* 6 in. 3 ft., tufted, erect or geniculate below, leafy chiefly near the base; nodes rarely rooting. *Leaves* 3–10 by $\frac{1}{8}$–$\frac{1}{4}$ in., usually flat, thin, acuminate, glabrous hairy or hirsute on both surfaces or beneath only; ligule short, fimbriate. *Panicle* 4–10 in., erect, often as broad as long. *Spikelets* green, yellow or purplish; gl. IV. variable in breadth, and in colouring, from pure white to greenish-brown, with 3–5 darker dorsal stripes.—Nees Fl. Afr. Austr. 51 has referred *P. trypheron*, Sch. to *P. curvatum*, L., a very different plant, and not a native of Bengal.

35. **P. humile,** *Nees ex Steud. Syn. Gram.* 84; dwarf, slender, leaves very narrow glabrous base narrow, panicle broad effuse lax-fld., branches subsolitary long spreading naked few-fld., branchlets capillary, spikelets $\frac{1}{16}$ in. pedicelled ovate acute glabrous, gl. I = $\frac{2}{3}$ III broadly ovate acuminate 3-nerved, II longest ovate-lanceolate acuminate 3-nerved, III ovate acute 3–5-nerved paleate neuter, IV much shorter broadly oblong obtuse pale shining. *Thw. Enum. Pl. Zeyl.* 360 (CP. 3243); *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W Ind.* 4, *Fodd. Grass. N. Ind.* 9. P. tenellum, *Griff. Notul.* iv. 21, *Ic. Pl. Asiat.* t. 139, f. 194 (*non Roxb.*).

The Panjab. *Thomson*; Bengal, Assam, Sikkim, Arracan, and southward to Ceylon.—Distrib. Borneo.

Annual. *Stem* 2–24 in., erect or geniculate below, much branched and often flowering from the base. *Leaves* 2–8 by $\frac{1}{8}$–$\frac{1}{6}$ in., flat, base hardly cordate; sheath glabrous, or mouth sparsely hairy. *Panicle* 1–3 in., often as long as the whole plant, very laxly and diffusely branched. *Spikelets* minute, pale or reddish.

36. **P. hydaspicum,** *Edgew. in Journ. Linn. Soc.* vi. (1862) 207; dwarf, leaves linear-lanceolate hirsute base narrow, panicle effuse much branched glabrous, branches erecto-patent alternate rarely opposite and branchlets and pedicels filiform, spikelets $\frac{1}{20}$–$\frac{1}{15}$ in. equalling or shorter than their pedicels solitary ovate acute glabrous, gls. membranous, nerves strong, I = $\frac{2}{3}$ III ovate acuminate 5-nerved, II and III subequal ovate subacute 5–7-nerved, III paleate, IV elliptic obtuse brown shining. *Aitchis. Cat. Panjab. Pl.* 159; *Duthie Grass. N.W. Ind.* 4. P. humile, *Aitchis. l. c.*

The Panjab and Upper Gangetic Plain; from the Ravee to the Indus. *Edgeworth*, &c. Central Provinces, *Duthie.*

Annual. *Stem* 6–18 in., geniculately ascending, rather stout below, branching from the very base. *Leaves* and *sheaths* clothed more or less thickly with long white hairs; sheaths inflated in some states. *Leaves* 1–2 by $\frac{1}{6}$–$\frac{1}{3}$ in., flat, soft, acute; ligule a row of hairs. *Panicle* 2–4 in., peduncled, erect, ovoid rachis, and branches quite smooth, hardly flexuous. *Spikelets* pale green, except the dark brown gl. IV; palea of III smaller than the gl., oblong.

37. **P. cæsium,** *Nees in Hook. Kew Journ.* ii. (1850) 97; erect, stout, hairy, leaves linear base narrow subcordate, panicle large erect subthyrsiform much branched, branches suberect lower fascicled, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. subsessile except the terminal broadly ovoid turgid nerves anastomosing, gl. I = $\frac{1}{4}$–$\frac{1}{3}$ III ovate obtuse 5-nerved, II and III subequal ovate acute 7–9-nerved, palea linear, IV = II elliptic-ovate obtuse pale smooth shining. P. reticulatum, *Thw. ex Trimen Cat. Ceyl. Pl.* 105 (*non Griseb.*).—Panicum, *Wall. Cat.* n. 8744.

Bengal, in the Jheels, J. D. H. & T. T. Cachar, *Keenan.* Malacca, *Griffith.* Nicobar Islds., *Kurz.* Ceylon; Pasdoon Corl, *Thwaites* (CP. 3890).—Distrib. Borneo, N. Guinea, Philippines.

Annual. *Stems* 2–3 ft., densely tufted, erect from the root. *Leaves* 6–10 by $\frac{1}{4}$–$\frac{1}{2}$ in., flat, soft, and sheaths more or less densely clothed with soft white spreading hairs; ligule a ridge of hairs. *Panicle* 10–18 in. long; branches angular, scaberulous. *Spikelets* solitary or geminate, red-brown. *Glumes* rather soft; II deciduous; IV pale yellow or brownish, sessile, margins narrowly incurved.—The Bornean and Philippine specimens are more slender and less hairy than the Indian.

†† Perennials.

§ Glume I very small, suborbicular, white, nerveless; (0 in *P. subeglume*); III 3–9-nerved, paleate or not.—Spikelets usually very shortly pedicelled.

36.* **P. maximum,** *Jacq. Ic. Pl. Rar.* i. t. 13; *Coll.* i. 76; tall, stout, erect, leafy, leaves long broadly linear or linear-lanceolate glabrous, panicle large decompound, lower branches whorled usually hairy, pedicels unequal capillary, spikelets $\frac{1}{10}$–$\frac{1}{12}$ in. solitary or in pairs elliptic-oblong acute or obtuse glabrous, gl. I = $\frac{1}{4}$ III white 0–3-nerved, II and III subequal 3–7-nerved, III paleate male, IV elliptic subacute transversely rugulose. *Sw. Fl. Ind. Occ.* i. 170; *Nees Agrost. Bras.* 166, *Fl. Afr. Austr.* 36; *Trin. Gram. Panic.* 221; *Pan. Gen.* 180; *Steud. Syn. Gram.* 72; *Wall. Cat.* n. 8715 A. B (*in part*) D.; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab Pl.* 159; *Griseb. Fl. Brit. W. Ind.* 549; *Baker Fl. Maurit.* 436; *Boiss. Fl. Orient.* v. 439. P. altissimum, *Brouss. Elench. Hort. Monsp.* (1805) 42; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98. P. confusum, *Trin. ex Steud. Nom. Ed.* II ii. 254. P. eburneum, *Trin. Pan. Gen.* 180; *Steud. Syn. Gram.* 73. P. Equisetum, *Nees, ex Doell in Mart. Fl. Bras.* ii. II, 206. P. fasciculatum, "*Pl. Carib. non Sw.*," *Griseb. Fl. Brit. W. Ind.* 549. P. gongylodes, *Jacq. Eclog. Gram.* 30, t. 21. P. jumentorum, *Pers. Syn.* i. 83; *H. B. & K. Nov. Gen. & Sp.* i. 104; *Thw. Enum. Pl. Zeyl.* 361: *Duthie Grass. N.W. Ind.* 5, *Fodd. Grass. N. Ind.* 9. P. læve, *Lamk. Ill.* i. 172. P. longipes, *Wight & Arn. in Wight Cat.* n. 1638. P. megiston, *Schult. Mant.* ii. 248. P. pamplemoussense, *Steud. l. c.* 71. P. polygamum, *Sw. Prodr. Veg. Ind. Occ.* 24. P. praticolum, *Saltzm. ex Doell in Mart. Fl. Bras.* ii. II, 203. P. trichocondylum, *Steud. l. c.* 74. P. tuberculatum, *Presl Rel. Hænk.* i. 307.

Cultivated in many parts of INDIA.—Native of Africa.

Perennial? 8–10 ft. high; stem branching, branches erect, nodes naked or bearded. *Leaves* 1–2 ft. by $\frac{1}{2}$–1 in., gradually narrowed from a small rounded or auricled base to a long filiform point, quite smooth, nearly glabrous; sheaths long, mouth villous; ligule of long hairs. *Panicle* 1–2 ft., quite erect, branches erect, filiform, smooth; pedicels usually shorter than the *spikelets*, glabrous or very sparsely pubescent, bright green, glistening, gls. thin.—This grass is described both as an annual and a perennial. Trinius' description of *P. eburneum* I think refers it to *maximum*; it is described as from Nepal.

Var. β, *Boiss. l. c.*; spikelets shortly hairy, gl. III neuter.—Peshawur, *Aitchison.* Affghan.—Apparently a smaller plant than typical *P. maximum.*

37. **P. repens,** *Linn. Sp. Pl. Ed.* 2, 87; stem creeping and stoloniferous below, leaves distichous linear-lanceolate flat or convolute glaucous, panicle usually contracted irregularly branched, branches 2–3-nate strict, spikelets $\frac{1}{10}$ in. sessile or shortly pedicelled ovate-lanceolate acute white, gl. I = $\frac{1}{6}$ III orbicular, II and III subequal ovate acute sub-5-nerved, III paleate or not male or neuter, IV ovate acute smooth. *Sibth. Fl. Græc.* i. t. 61; *Nees Agrost. Bras.* 171; *Kunth Enum. Pl.* i. 103; *Trim. Cat. Ceyl. Pl.* 105;

Aitchis. Cat. Punjab Pl. 160; *Duthie Grass. N.W. Ind.* 6, *Fodd. Grass. N. Ind.* 11; *Boiss. Fl. Orient.* vii. 440; *Benth. Fl. Hongk.* 412. P. airoides, *Br. Prodr.* 190; *Kunth l. c.* 122. P. aquaticum, *A. Rich. Tent. Fl. Abyss.* ii. 373. P. arenarium, *Brot. Fl. Lusit.* i. 82, *Phyt. Lusit.* i. 15, t. 6; *Nees Agrost. Bras.* i. 170, *Fl. Afr. Austr.* 37; *Trin. Pan. Gen.* 181. P. coloratum, *Cav. Ic.* ii. 6, t. 110. P. convolutum, *Beauv. ex Spreng. Syst.* i. 319. P. hygrocharis, *Steud. l. c.* 72. P. ischæmoides, *Retz. Obs.* iv. 17; *Rottl. in Neue Schrift.* iv. (1803) 185; *Steud. l. c.* 98; *Wight Cat.* n. 1627; *Wall. Cat.* n. 8710. P. multinode, *Lamk. Encycl.* iv. 747 (*ex Nees Agrost. Bras.*). P. paludosum, *Hochst. ex Steud. l. c.* 72 (*not of Roxb.*). P. polystachion, *Ucria, Hort. Reg. Panorm.* 54. P. psilopodium, *Trin. ex Wight Cat.* n. 1633 C.; *Herb. Strach. & Winterb.* No. 5. P. Roxburgianum, *Schult. Mant.* ii. 245. P. sarmentosum, *Hb. Wight ex Wall. Cat.* 8710 C. ?P. uliginosum, *Roxb. Fl. Ind.* i. 308; *Wall. Cat.* n. 8710 A; *Kunth l. c.* 126.—Panicum, *Wall. Cat.* n. 8714 E, 8746.

Throughout INDIA, by banks of streams and in dry places, from the Panjab eastwards and southwards. CEYLON, *Walker, Gardner.*—DISTRIB. S. Europe, Asia, Afr., Amer.

Stems 2–6 ft., erect or ascending from a stout creeping rootstock, leafy, simple or branched below, nodes rooting. *Leaves* 3–6 in., strict, often glaucous, usually narrow and involute, smooth, glabrous or hairy on the upper surface, margins sometimes toothed towards the ciliate rounded base; sheaths with ciliate margins; ligule a narrow coriaceous ring. *Panicle* 3–8 in., branches usually erect, very slender, angular, scaberulous; pedicels short, tip cupular. *Spikelets* erect, quite glabrous; gl. I membranous, nerveless or 3-nerved; palea of III truncate; IV shortly broadly stipitate, pale. *Anthers* red.—Roxburgh distinguishes his *P. uliginosum* from *P. paludosum* (proliferum, *Lamk.*) by the tetragonous smooth branches of the panicle, whereas in *P. paludosum* these are trigonous with acute hispid angles. I have seen no authentic specimens of his *P. uliginosum*, but his figure of "Gundru" (the native name which he gives for it) does not show this character of the panicle.

38. **P. proliferum**, *Lam. Encycl.* iv. 747; stem erect from a floating base, leaves linear or ensiform acute serrulate usually flat, panicle with long virgate spreading branches bearing short few-fld. branchlets and solitary sessile or shortly pedicelled spikelets which lie parallel to the branchlet, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. lanceolate, gl. I = $\frac{1}{6}$–$\frac{1}{4}$ III orbicular, II ovate acuminate 9-nerved, III lanceolate 9-nerved paleate or not, IV oblong acuminate smooth. *Nees Agrost. Bras.* 170; *Kunth Enum. Pl.* i. 100; *Steud. Syn. Gram.* 71; *Muell. Fragment.* viii. 191 (*the King's Creek plant*). P. aurantiacum, *Ham. ex Wall. Cat.* n. 8714 B. P. gongylodes, *Jacq. Eclog. Gram.* iii. t. 21. ?P. decompositum, *Duthie Grass. N.W. Ind.* 3. P. decompositum, *var.* paludosum, *Trim. Cat. Ceyl. Pl.* 105. P. elephantipes, *Nees Agrost. Bras.* 165. P. Elliottii, *Trin. ex Nees l. c.* 170. P. fistulosum, *Hochst. ex Steud. l. c.* 71. P. natans, *Koen. ex Trin. Panic. Gen.* 237. P. paludosum, *Roxb. Fl. Ind.* i. 307; *Wall. Cat.* n. 8711; *Nees Fl. Afr. Austr.* 35; *Kunth l. c.* 126; *Griff. Notul.* 37, *Ic. Pl. Asiat.* t. 139, f. 127; *Duthie Fodd. Grass. N. Ind.* 11. P. repens, *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Trin. Pan. Gen.* 179. P. rigidum, *Heyne in Herb. Rottl.*—Panicum, *Wall. Cat.* n. 8714A. (*in part*) B. C. D.

Marshes and still waters throughout the low countries of INDIA, from the Panjab to Assam and southward. CEYLON.—DISTRIB. Tropics generally.

Perennial. *Stem* 2–3 ft. or more; lower nodes spongy, as thick as the little finger. *Leaves* 6–12 by $\frac{1}{4}$–$\frac{2}{3}$ in., base broad but hardly cordate; sheaths loose;

ligule a ridge of hairs. *Panicle* 6–10 in., often nearly as broad, lower branches whorled and fascicled, trigonous, scaberulous. *Spikelets* green, variable in size, terete, palea of gl. III 0, or minute, or linear, neuter or male rarely bisexual.—Closely allied to (if not a more luxuriant aquatic form of) *P. repens*, and confused with it as to synonymy; but a coarser plant, with a more spreading panicle, more acuminate spikelets and a more oblong gl. IV. Further, *P. repens* has normally shorter glaucous narrower convolute leaves, and a more irregularly branched panicle. Also very near the Australian P. *decompositum*, Br., which has normally a decompound panicle with more slender spreading branches and branchlets, and distant solitary spikelets.

Dr. Stapf has made for me a careful analysis of the spikelets of a large series of specimens, and I have made many myself, with the view of testing the value of the absence or presence of the palea in gl. III, and its sexuality. As examples he finds in 9 spikelets taken promiscuously 3 epaleate and 6 with reduced paleas. In 5 others all are paleate and male, in 3 others all paleate but neuter. In 9 others all epaleate. In a branch with 10 spikelets, 9 of them had gl. III paleate, 1 epaleate. Of 6 spikelets from near the base of a branch, 3 epaleate, 2 male with a rudimentary ovary, 3 paleate and female. Of 8 spikelets from a branch in the lower part of a panicle, 2 lowest epaleate, 6 paleate and bisexual.

39. **P. subeglume,** *Trin. Pan. Gen.* 204; stem slender, leaves linear, base narrowed, panicle large effuse, rachis and branches flexuous capillary, spikelets $\frac{1}{12}$ in. pedicelled elliptic-oblong subacute, gl. I and II absent, III and IV equal, III 5–7-nerved glabrous or silky, IV elliptic-oblong or lanceolate cuspidate. *Steud. Syn. Gram.* 84. P. arcuatum, *Br. ex Nees in Wight Cat.* n. 1639 (*non Br. Prodr.*). P. Brownianum, *Wight & Arn. ex Steud. l. c.* 98. P. Torreyanum, *Wight et Arn. ex Steud. Nom. Ed.* II, ii. 264; *Wight Cat.* n. 1634. Milium capillare, *Roth Nov. Sp.* 39; *Kunth Enum. Pl.* i. 67. M. tomentosum, *Koen. ex Rottl. in Ges. Naturf. Fr. Neue Schr.* iv. (1803) 220; *Steud. Syn. Gram.* 34; *Kunth l. c.* 66.—Isachne? *Wall. Cat.* n. 8659.

Southern Deccan, *Heyne*; Madura, *Rottler*; Palaveram, *Wight*.

Perennial. *Stem* 1–2 ft., soft. *Leaves* 3–6 by $\frac{1}{2}$ in. or less, finely acuminate, and sheaths glabrous softly hairy or tomentose; ligule short, membranous. *Panicle* 3–7 in., spreading, glabrous; lower branches suberect, alternate, divided from the base. *Spikelets* much shorter than their pedicels, erect, dorsally compressed. *Grain* linear-oblong, obtuse.—The absence of gl. I and II are characters of *Paspalum*, but the habit and inflorescence are those of a *Panicum*.

§§ Gl. I = $\frac{1}{3}$ to $\frac{3}{4}$ III, 5–7-nerved.

α Spikelets acute or acuminate. (See also *P. auritum*.)

40. **P. incisum,** *Munro ex Clarke in Journ. Linn. Soc.* xxv. (1890) 84, t. 33; stem slender, leaves long linear-lanceolate base narrow, panicle effuse very lax, rachis branches and pedicels very slender subscaberulous, pedicels very long, spikelets $\frac{1}{6}$ in. remote solitary elliptic acuminate, gl. I about = $\frac{2}{3}$ III ovate acute 1–3-nerved, II and III subequal, II 5-nerved, III 7-nerved, palea short, IV elliptic acuminate quite smooth polished margin narrowly inflexed. *Munro Cat. Pl. Griffith, &c., ined.* p. 56.

Upper Assam; Naga hills, *Griffith*; Nambre forest, alt. 400 ft., *Clarke*.

Perennial. *Stem* 1–2 ft., quite glabrous. *Leaves* 5–10 by $\frac{1}{2}$–$\frac{2}{3}$ in., finely acuminate; ligule elongate-oblong, scarious. *Panicle* 3–6 in., usually sessile as it were on the upper leaf sheath. *Spikelets* many times shorter than their pedicels, obscurely articulate at the base; glumes distant on a distinct inarticulate racheola; II fugacious; IV rather shorter than II, brown.—Altogether resembles an *Isachne* in habit,

and in the spikelet being obscurely jointed on the pedicel. A very closely allied plant collected by Beddome in the Anamallay hills has a much broader rounded and cordate leaf-base, the spikelets are too immature for description.

41. **P. antidotale**, *Retz. Obs.* iv. 17; tall, glabrous, branching, leaves linear flat base rounded, panicle large effuse or contracted, branches slender glabrous lower fascicled divided from the base, spikelets $\frac{1}{10}$ in. shortly pedicelled solitary or clustered ovoid acute, gl. I and II with broad membranous margins, I = $\frac{1}{2}$ III broadly ovate acute 5-nerved, II and III subequal strongly 5–7-nerved, II obtuse, III paleate, IV ovate or oblong acute smooth. *Trin. Gram. Pan.* 227, *Pan. Gen.* 195; *Nees Agrost. Bras.* 201; *Kunth Enum. Pl.* i. 125; *Steud. Syn. Gram.* 77; *Wight Cat.* n. 1630; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Panjab Pl.* 158, *Duthie Grass. N.W. Ind.* 2, *Indig. Fodd. Grass.* t. 3, *Fodd. Grass. N. Ind.* 4; *Benth. Fl. Austral.* vii. 483; *Boiss. Fl. Orient.* v. 440. P. maximum, *Wall. Cat.* n. 8715 B (*in part*) C (*in part*). P. polygamum, *Herb. Madr. ex Wight Cat.* n. 1630. P. pruinosum, *Bernh. ex Trin. Pan. Gen.* 191. P. subalbidum. *Kunth Revis. Gram.* ii. 397, t. 112, *Enum.* 101. P. tenue, *Roxb. ex Wight Cat.* (*sub* n. 1628 *non Fl. Ind.*). Milium arundinaceum, *Koen. ex Wight Cat. l. c.*

The Panjab and Upper Gangetic plain, and southward to the S. Deccan and Ceylon.—Distrib. Affghan., Afric., trop. Austral.

Perennial, sometimes shrubby, with a stout creeping rootstock bearing villously sheathed stolons; branches as thick as a crow-quill; internodes solid, woody, terete, smooth; nodes thickened. *Leaves* 6 by $\frac{1}{6}$ in., narrowed from the base to the slender tip, flat, rather rigid, smooth on both surfaces, base narrow rounded, midrib distinct; nerves many, slender; sheaths quite smooth; ligule a ridge of hairs. *Panicle* 6 in. high, branches filiform, lower nearly 2 in. long, sparingly divided; branchlets rather short; capillary. *Spikelets* quite glabrous; gls. rather thin, pale green; palea of III nearly as long as the gl., 2-toothed, nerves strong or slender; IV shorter than III, shortly stipitate, coriaceous, margins incurved; palea as large as the gl. *Lodicules* minute, orbicular. *Filaments* very short; anthers linear-oblong. *Ovary* narrow; styles short, free, stigmas broad.—Roxburgh describes *P. tenue* as having "seeds ovate transversely waved," whereas they are quite smooth in *P. antidotale*.

42. **P. elegantissimum**, *Hook. f.*; tall, erect from the base, very slender, leaves subradical very long narrow softly pubescent base narrow, peduncle very long and slender, panicle effuse very broad laxly few-fld., branches long alternate distant solitary naked below and branchlets capillary quite smooth, spikelets $\frac{1}{10}$ in. few on each branchlet shortly pedicelled ovate acuminate, gl. I about $\frac{1}{3}$ III ovate mucronate 5–7-nerved, II and III stipitate subequal ovate cuspidately acuminate, II 7-nerved 5 of the nerves strong above, III nerves 7 slender, palea small ovate, IV elliptic-oblong obtuse as long as II white shining smooth.

Malay Peninsula; Perak, *Ridley*.

Perennial. *Stem* 2–3 ft., tufted, and branched at the very base, stiff. *Leaves* chiefly subradical, 10–18 by $\frac{1}{6}$ in., gradually narrowed from the base to the slender tip, strict, suberect, softly hairy all over; mouth of sheath villous; ligule a fascicle of hairs. *Panicle* 12–18 by 6–12 in., scaberulous; branches 1–3 in. apart. *Spikelets* very few and remote, reddish; gl. I inserted much below the others; IV sessile by a broad base.—A most elegant grass.

43. **P. acroanthum**, *Steud. Syn. Gram.* 87; glabrous, erect, very slender, leaves narrow base contracted, panicle broad very effuse lax-fld.,

branches subsolitary naked below, and long spreading few-fld. naked branchlets capillary, spikelets $\frac{1}{12}$ in. long-pedicelled ovate-oblong acute glabrous or sparsely puberulous, gl. I = $\frac{1}{3}$ III ovate obtuse 1-nerved, II and III subequal subacute 5-nerved, III epaleate, IV elliptic-oblong subacute palea quite smooth. *Miq. Prolus. Fl. Jap.* 163; *Franch. & Sav. En. Pl. Jap.* ii. 162.

Upper Assam; Mishmi Hills, *Griffith.*—Distrib. China, Japan.

Perennial. *Stem* 2–3 ft., erect, not or rarely branched; nodes glabrous. *Leaves* 3–5 by $\frac{1}{6}$–$\frac{1}{3}$ in., thin, flat, glabrous, as are the sheaths; ligule a few hairs. *Panicle* 3–4 in. long and broad, very lax, open, with few scattered brownish or greenish spikelets; branches branchlets and pedicels perfectly smooth, gl. I II & III membranous; IV thinly coriaceous, sessile.—I find no trace of a palea in gl. III of any specimen. No other species of this group has sparsely pubescent spikelets, except var. β of *P. maximum.*

β. Spikelets obtuse or subacute.

* *Gl. III. epaleate.*

44. **P. montanum,** *Roxb. Fl. Ind.* i. 313 (*excl. descr. gl. IV.*); stem tall firm, leaves long lanceolate base broad deeply cordate, panicle large loose, rachis branches and pedicels very long capillary smooth, spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. solitary oblong obtuse or subacute, gl. I = $\frac{1}{4}$ III ovate 5-nerved, II and III subequal obtuse 5-nerved, III epaleate. IV ovate subacute smooth. *Kunth Enum. Pl.* 126; *Benth. Fl. Hongk.* 412; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Pl. Ceyl.* 105. P. barbatulum, *Wall. ms.* P. courtallense, *Nees & Arn. ex Wight Cat.* n. 2342, *Herb.* 1362, 3049; *Steud. Syn. Gram.* 83. P. euchroum, *Steud. l. c.* 98. ? P. notatum (montanum, *Roxb.*), *Wight Cat.* 1362 (*non Retz*). P. trinapalium, *Hb. Ham. ex Wall. Cat.* n. 8722 A.—Panicum, *Wall. Cat.* n. 8719, 8722, 8739.

Hotter hilly parts of India, from the lower Himalaya in Garwhal, *Duthie,* to Sikkim, Burma, the Khasia Hills, and southward to Penang and Ceylon.—Distrib. Malaya, China, Philippines.

Perennial. *Stem* 3–4 ft. or more. smooth, hard, sparingly branched. *Leaves* 5–7 by $\frac{3}{4}$–$1\frac{1}{4}$ in., thin, glabrous or pilose, smooth or scaberulous beneath, striate, base ciliate, midrib sometimes excentric; sheath glabrous or pubescent, mouth hairy; ligule obscure. *Panicle* 8–18 by 8–10 in.; branches whorled or alternate, axils sometimes glandular, lower strict and unbranched from 1–3 in. *Spikelets* terete, glabrous or faintly hairy; gl. II fugacious.—I do not find gl. IV to have 3 stripes as described and figured by Roxburgh, nor is it as broad as in his figure; but that the plant I have described is Roxburgh's is confirmed by a specimen so named by himself. *P. montanum* has been referred by Wight to the Sumatran *P. notatum,* Retz (Obs. iv. 18), but that plant is described as having scabrid branches of the panicle, purple spikelets, and acute glumes. The black spots at the axils of the panicle seen in dried specimens of both species, are probably due to a glandular secretion. Wallich's n. 8739, from Ava, has very long pedicels and broad glumes, and a broader gl. IV, but the latter is narrower than in Roxburgh's figure. Duthie (Grass. N.W. Ind. 5) gives Stewart as authority for this grass being found in marshes near Peshawur, but I suspect that *Isachne himalaica* was taken for it.

45. **P. humidorum,** *Ham. in Wall. Cat.* n. 8721; tall, slender, leaves linear base narrowly cordate, panicle large loose, rachis branches and (rather short) pedicels capillary smooth, spikelets $\frac{1}{20}$ in. ellipsoid obtuse glabrous, gl. I = $\frac{2}{3}$ III obtuse 3-nerved, II and III obscurely 5-nerved, III epaleate, IV ovate or oblong smooth.

Assam; Goalpara, *Hamilton*. Silhet, Cachar, the Khasia and Naga Hills, and the Jheels.

Perennial. Gregarious in water (*Clarke*). Habit of *P. montanum*, but much more slender, with narrower leaves 4–8 by $\frac{1}{4}$–$\frac{1}{3}$ in., a smaller panicle, with shorter pedicels and much smaller spikelets. *Gl.* II fugacious.

Var. ? *perakense*; stem robust nearly as stout as a goose-quill below, leaves $\frac{1}{2}$ in. broad, spikelets broader, nerves stronger. Perak, *King's Collector* (n. 2546).—Probably a different species.

46. **P. khasianum,** *Munro mss.*; tall, leaves linear or linear-lanceolate base narrowly cordate, panicle very large branches very long slender smooth, pedicels long or short, spikelets subsolitary $\frac{1}{16}$–$\frac{1}{12}$ in. ellipsoid subacute glabrous, gl. I minute much shorter than III, nerves 0 or 3 obscure, II and III subequal 5-nerved, III epaleate, IV elliptic-oblong subacute smooth.

E. Nepal and Sikkim, alt. 4–7000 ft., *J. D. H.*, *Clarke*. Khasia Hills, in marshes, alt. 4–6000 ft., *Griffith*, &c.

Perennial. *Stem* prostrate and creeping below, then erect, 3–6 ft. *Leaves* 6–12 by $\frac{2}{3}$–$1\frac{1}{4}$ in., thin, glabrous hairy or subscabrid, many-nerved, base usually contracted with incurved auricles, not or obscurely ciliate; sheath smooth or hispidly hairy, mouth bearded; ligule very short, ciliate. *Panicle* 6–12 in., often as broad; lower branches nearly as long, solitary or fascicled, unbranched below.—Near *P. montanum*, differing in the narrower leaf-base, very short gl. I, and in gl. II not fugacious. Also near *P. sarmentosum*, from which the minute gl. I distinguishes it.

** *Gl. III paleate.*

47. **P. sarmentosum,** *Roxb. Fl. Ind.* i. 308; tall, branched, scandent, leaves long base narrow rounded, panicle pyramidal or ovoid loosely branched glabrous, rachis smooth, branches half-whorled capillary, spikelets $\frac{1}{18}$–$\frac{1}{16}$ in., sessile or shortly pedicelled ovoid tips obtuse ciliolate, gl. I = $\frac{1}{2}$ III or more obtuse or subacute 3–5-nerved, II and III subequal orbicular nerves 5 broad, III palea small narrow, IV small ellipsoid subacute dorsally rounded smooth. *Kunth Enum. Pl.* i. 126; *Steud. Syn. Gram.* 98. P. microgonostum & P. vacillans, *Steud. l. c.* 75; *Miq. Fl. Ind. Bat.* iii. 456. P. concinnum, *Nees in Hook. Kew Journ.* ii. (1850) 97; *Steud. l. c.* 78; *Miq. l. c.* 457. P. incomptum, *Trin. Diss.* ii. 200, *Gram. Panic.* 200, *Sp. Gram. Ic.* t. 232; *Kunth l. c.* 112; *Steud. l. c.* 88; *Nees in Mart. Fl. Bras.* ii. 207; *Herb. Wight* (*Kew Distrib.* n. 6492). P. maximum, *Wall. Cat.* n. 8715 E. P. tjicoyaense, *Steud. l. c.* 70. ? P. incomptum, *Duthie Grass. N.W. Ind.* 4. —Panicum, *Wall. Cat.* n. 8709.

Assam, Silhet, Cachar, and the Khasia Hills, ascending to 5000 ft., Chittagong, Burma, and the Malay Peninsula.—Distrib. Malay Isids., China, Tonkin.

Perennial. *Stems* attaining 50 ft., often as thick as a goose-quill, solid, pubescent or glabrous, with whorls of long wiry slender branching roots at the bearded nodes below, whence the flowering branches issue. *Leaves* 12–15 by $\frac{1}{2}$–$1\frac{1}{4}$ in., linear-lanceolate, finely acuminate, base rounded or subcordate, smooth or hairy on both surfaces or beneath especially, many-nerved; sheaths smooth or sparsely hairy; ligule a brush of hairs. *Panicle* 6–12 in., very variable, branches erect or spreading, long or short, branchlets often creeping and entangling, straight or flexuous. *Spikelets* erect or spreading.—Duthie gives *P. incomptum* as a native of Garwhal, alt. 4–5000 ft., but I have not seen *P. sarmentosum*, Roxb. from the westward of Assam, and I suspect that *P. montanum* is the plant intended. Of *P. concinnum*, which is

Cuming's n. 2284, Miquel says, stem villous under the panicle. Benth. (Fl. Hongk.) refers *concinnum* to *sarmentosum*, and includes *incomptum*. I do not find the Hongkong specimen in Herb. Kew. There are no specimens of this in Herb. Linn. Soc. and Wallich's ticket No. 8709 has A. Hb. Finlayson, B. Silhet, C. Penang, D. Tavoy, E. Singapore.

Sect. VII. PTYCHOPHYLLUM. (See p. 28.)

48. **P. plicatum,** *Lamk. Encycl.* iv. 736; perennial, leaves plicate from linear-lanceolate to elliptic-oblong, panicle elongate lax-fld., branchlets often ending in a stiff bristle, gl. I = ½ III or more orbicular-ovate 5-nerved, II = ½ IV or longer 5–7-nerved obtuse, III = IV dorsally flattened acute 5–9-nerved, IV ovate-lanceolate rugulose. *Jacq. Eclog. Gram.* i. t. 1; *Trin. Gram. Panic.* 183, *Gen. Pan.* 161, *Sp. Gram. Ic.* t. 223; *Kunth Enum. Pl.* i. 94; *Wall. Cat.* n. 8705; *Griff. Notul.* iii. 24, *Ic. Pl. Asiat.* t. 139, fig. 229; *Thw. Enum. Pl. Zeyl.* 360 (*excl. P. costatum*); *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 6, *Fodd. Grass. N. Ind.* 11; *Benth. Fl. Hongk.* 411; *Anderss. in Walp. Ann.* vi. 944. P. amplissimum, *Steud. l. c.* 54. P. asperatum, *Kunth Revis. Gram.* i. 39, *Enum. Pl. l. c.* 39; *Miquel Fl. Ind. Bat.* iii. 456. P. excurrens, *Trin. Pan. Gen.* 131, 249, *Sp. Gram. Ic.* t. 49; *Kunth Enum.* i. 94; *Benth. Fl. Hongk.* 412, *excl. syn.* P. Kleinianum, *Nees ex Anderss. in Walp. Ann.* vi. 946. P. lene, *Steud. l. c.* 54. P. mauritianum, *Willd. ex Spreng. Syst.* i. 305. P. nepalense, *Spreng. l. c.* 321; *Kunth Enum.* i. 94; *Dalz. & Gibs. Bomb. Fl.* 291; *Aitchis. Cat. Panjab Pl.* 160; *Miq. l. c.* 448. P. nervosum, *Roxb. Fl. Ind.* i. 311; *Wall. Cat.* n. 8702. P. neurodes, *Schult. Mant.* ii. 228; *Wight Cat.* n. 1647; *Anderss. l. c.* 945; *Duthie Grass N.W. Ind.* 5. P. paucisetum, *Steud. l. c.* 52. P. palmifolium, *Koen. in Naturforsch.* xxiii. (1788) 208; *Kunth Enum.* 93; *Anderss. l. c.* 945. P. Wallichianum, *Nees Fl. Afr. Austr.* 49; *Miq. l. c.* 449.—Panicum, *Wall. Cat.* n. 8703.

Throughout the moister hilly parts of India, from KUMAON in the Himalaya eastward, ascending to 5000 ft. in SIKKIM, the Shan Hills in BURMA, the NILGHIRIS, alt. 6000 ft., the MALAY PENINSULA, and CEYLON.—DISTRIB. China, Malay Islands.

Stem 1–8 ft., erect or ascending from a woody branched stock, from the thickness of a sparrow's to a swan's quill, leafy. *Leaves* 6–24 by ½–4 in., finely acuminate, sessile on the sheath or petioled, membranous or chartaceous, glabrous or sparsely hairy; sheath sometimes hispid, mouth ciliate; ligule short. *Panicle* thyrsoid, striate and erect with short branches, or effuse and drooping, 1–2 ft. long, with branches 2–4 in. long (spiciform in reduced states); branches, pedicels and their setiferous scabrid tips green or purplish. *Spikelets* ⅛ in., ovoid; gl. I = ½ III or less, very broadly ovate, obtuse or acute, 5–7-nerved, paleate or not, male or neuter; IV acuminate, coriaceous, more or less rugulose.—After a study of an immense suite of specimens of this species from all parts of India, I am unable to follow Andersson (in Walp. Ann. l. c.) in his separation of it into *plicatum*, *palmifolium*, *neurodes* and the seven vars. of the latter. These are, I think, all forms chiefly dependent on climate and age. Lamark's *P. plicatum* was described (1797) from a cultivated specimen of uncertain origin (Mauritius or St. Domingo), but Jacquin's excellent figure of it leaves no doubt of its identity with the Indian plant, for it resembles no American one. It has been widely cultivated for nearly a century, and a garden specimen in Bentham's Herb. supports the identification. I doubt *P. palmifolium* of Poiret being specifically different, it is described from an E. Indian specimen, though Grisebach (Fl. Brit. Ind. 547) identifies it with the W. Indian *P. sulcatum*, Aubl. Grisebach distinguishes *palmifolium* from *plicatum* by gl. II of the latter shorter than IV, and longer in *palmifolium*, but I find this a most variable character and not borne out by the

material that Grisebach worked upon. He also describes gl. IV as ellipsoid, but it is ovate-lanceolate in both. Whether *P. sulcatum* is specifically different may be doubted. *P. excurrens*, Trin., is a small narrow-leaved flaccid (perhaps young) state, with a very slender panicle and erect branches; it is Wall. Cat. n. 8703, and a common Himalayan form. Wall. Cat. n. 8705 is a gigantic form from Silhet, where I found it abundantly.

48.* **P. flavescens,** *Sw. Prodr. Veg. Ind. Occ.* 23, *Fl. Ind. Occ.* i. 158; annual, leaves plicate linear-lanceolate, panicle erect branches spreading simple pubescent and bristly, spikelets subsecund, gl. I = $\frac{1}{4}$–$\frac{1}{3}$ III orbicular obtuse 3-nerved, II = $\frac{1}{2}$ IV apiculate 5–7-nerved, III = IV 5–7-nerved paleate male, IV ellipsoid acuminate transversely rugulose. *Kunth Enum. Pl.* i. 128; *Steud. Syn. Gram.* 80; *Griseb. Fl. Brit. W. Ind.* 547. P. barbatum, *Telf. ex Wall. Cat.* n. 8689 D. P. costatum, *Roxb. Fl. Ind.* i. 312; *Wall. Cat. l. c.*; *Kunth l. c.* 93; *Steud. l. c.* 64; *Anderss. in Walp. Ann.* vi. 947. P. fasciculatum β, *Nees Agrost. Bras.* 152. P. mauritianum, *Herb. Willd. ex Spreng. Syst.* i. 305. P. paractaenioides, *Trin. in Mem. Acad. Petersb.* Ser. 6, iii. II (1835) 219. P. Thouarsianum, *Nees ex Steud. l. c.* 62. P. plicatum *var.* costatum, *Baker Fl. Maurit.* 437. Setaria mauritiana, *Spreng. Syst.* i. 305 (*ex Baker*).

Cultivated in HORT. BOT. CALC., *Wallich.* SIAM? *Herb. Finlayson.*—DISTRIB. Trop. Amer.

Stem 3–6 ft., slender above, stout branched creeping and rooting below. *Leaves* 5–8 by $\frac{1}{2}$–1 in., finely acuminate, narrowed to the very narrow base, thin, flaccid, softly hairy on both surfaces; sheath with hispidly ciliate margins towards the contracted mouth; ligule obscure. *Panicle* 3–5 in., ovate-oblong, branches 1–1$\frac{1}{2}$ in. *Spikelets* $\frac{1}{10}$ in., subsessile, green.—This grass is described as annual by Grisebach, and as perennial by other authors.

49. **P. rhachitrichum,** *Hochst. in Flora,* xxvii. (1844) 254; annual, nodes of stem pubescent, leaves plicate, panicle subpyramidal, branches slender spreading and pedicels laxly hairy, gl. I minute membranous, II and III subequal ovate-oblong obtuse, III paleate neuter, IV ellipsoid rugulose tip rounded. *Parlat. in Hook. Niger Flora,* 187; *Steud. Syn. Gram.* 63. P. chamaeraphis, *Nees ex A. Braun, Ind. Sem. Hort. Berol.* (1853), *App.* 20; *Anderss. in Walp. Ann.* vi. 947. P. homonymum, *Steud. l. c.* 48; *Duthie Grass. N.W. Ind.* 4 (homogynum).

SUBTROPICAL HIMALAYA; Dehra Dhun, *Royle*; Chamba, alt. 5000 ft., *Clarke*; Kumaon, *Duthie*; Sikkim, alt. 6000 ft. CHOTA NAGPUR and CALCUTTA, *Clarke.* DISTRIB. Africa trop.

Stems tufted, erect, 8–18 in., leafy. *Leaves* 6–8 by 1–1$\frac{1}{4}$ in., flaccid, glabrous or sparsely hairy, base rounded; margins and mouth of sheath villous. *Panicle* 2–6 in., branches alternate spreading; rachis very slender, flexuous, bristle of pedicel twice as long as the spikelet. *Spikelets* $\frac{1}{10}$ in., secund, 1–2-seriate, loosely or densely imbricate, sometimes fascicled in the Calcutta specimens, dorsally compressed; gls. membranous, pale, nerves green; I 1–3-nerved; II 5–6-nerved, obtuse; III 5-nerved, palea minute.

Sect. VIII. GIBBOSÆ. (See p. 25.)

* *Spikelets usually shortly pedicelled.*

50. **P. trigonum,** *Retz. Obs.* iii. 9 (*excl. Syn. Burm.*); leaves 1–2 in., panicle contracted, branches short, spikelets $\frac{1}{16}$ in. very shortly pedicelled

hispidulous, gl. I = about ½ III obtuse or acute 3-nerved, III 5-nerved. *Kunth Enum. Pl.* i. 116; *Nees Agrost. Bras.* 206; *Roxb. Fl. Ind.* i. 305; *Thw. Enum. Pl. Zeyl.* 359 (*in part*); *Trim. Cat. Ceyl. Pl.* 205. P. difforme, *Roth Nov. Sp.* 52. P. gibbum, *Steud. l. c.* 87. P. radicans, *Buhse in Miq. Pl. Jungh.* 375; *Miq. Fl. Ind. Bat.* iii. 453 (*non Retz*). P. repens and Burmanni, *Heyne ex Herb. Wight.* Aira repens, *Hb. Heyne ex Wall. Cat.* n. 8743 A.—Panicum, *Wall. Cat.* 8743 A. C.

Lower Bengal, *Wallich.* The Deccan Peninsula, *Heyne*, &c. Ceylon, *Walker*, &c., *Thwaites* (C.P. n. 888).—Distrib. Java.

Perennial. *Stem* as thick as packthread, decumbent branching and interlaced below; branches erect. *Leaves* linear-lanceolate, glabrous or laxly hairy; sheath glabrous or margin ciliate; ligule rounded. *Panicle* 1–1½ in., rachis and short suberect branches glabrous; gl. I–III pale brown; tip of IV naked or bearded.

51. **P. pilipes,** *Nees & Arn. ex Büse in Miq. Pl. Jungh.* iii. 376; tall, leaves 2–6 in., panicle contracted, branches short with often slender hairs on the pedicels, spikelets $\frac{1}{16}$ in. very shortly pedicelled glabrous, gl. I = about ½ III obtuse 3-nerved, III 5-nerved. *Wight Cat.* n. 2343; *Miq. Fl. Ind. Bat.* iii. 453; *Trim. Cat. Ceyl. Pl.* 105. P. hermaphroditum, *Steud. Syn. Gram.* 67; *Benth. Fl. Austral.* vii. 485. P. oxyphyllum, *Hochst. ex Steud. l. c.* 65. ? P. carinatum, *Presl Rel. Haenk.* i. 309 (*ex Hack. in Engl. Bot. Jahrb.* vi. (1885) 235).—Panicum, *Wall. Cat.* n. 8743 B. D.

Sikkim Terai, *Clarke.* Khasia Hills, alt. 0–2500 ft., common. Burma, Central Provinces, Nilghiri Hills, alt. 4000 ft., the Malay Peninsula, Nicobar Islds. and Ceylon (C.P. 100, 709, 891).—Distrib. Tonkin, Malaya, Australia, Pacific Islds., Mascarene Islds. and Madagascar.

Perennial. *Stem* 1–2 ft., geniculately ascending from a slender creeping branching base, lower nodes rooting, upper subpubescent. *Leaves* ⅓–1½ in. diam., glabrous or sparsely hairy above, puberulous beneath, finely acuminate, base narrow; sheath glabrous or ciliate, mouth hairy; ligule rounded. *Panicle* 3–5 in.; branches rather remote, erect or spreading with short fastigiate branchlets; spikelets brown; gl. IV white, its palea narrow, patent, hard.—The Madagascar and Seychelle Islds. *P. multinode,* Lamk, is very closely allied, if not the same, in which case that name takes priority. In Nicobar specimens the spikelets are sparsely pubescent. Thwaites regarded *pilipes* as a form of *P. trigonum.*

** *Pedicels capillary, much longer than the spikelets.*

52. **P. patens,** *Linn. Sp. Pl.* 86; stem creeping and rooting below, leaves ovate to linear-lanceolate glabrous or ciliated below with tubercle-based hairs, panicle contracted or effuse, rachis branches and pedicels capillary, gl. I = ⅓–⅔ III ovate obtuse 3-nerved, II and III glabrous or with ciliate tips. *Burm. Fl. Ind.* t. 10, f. 2; *Spreng. Syst.* i. 322 (*excl. syn.* multinode); *Kunth Enum. Pl.* i. 126 (*excl. syn. Roxb.*). P. accrescens, *Trin. Sp. Gram. Ic.* t. 88, *& corrigend.* vol. iii.; *Kunth l. c.* 116. P. obliquum, *Roth Nov. Sp.* 51; *Kunth l. c.* 103; *Miq. Fl. Ind. Bat.* iii. 452. P. radicans, *Retz. Obs.* iv. 18; ? *Trin. Pan. Gen.* 218; *Nees Agrost. Bras.* 206; *Kunth l. c.* 216; *Wight Cat.* n. 2344. P. trigonum, *in part, Thw. Enum. Pl. Zeyl.* 359. P. velutinum, *Willd. Herb. ex Spreng. l. c.*—Panicum, *Wall. Cat.* n. 8738, 8740.

Throughout India, from the Lower Himalaya in Garwhal to Sikkim, and the Khasia Hills, ascending to 3000 ft., southward to the Malayan Peninsula and Ceylon.—Distrib. E. tropical Asia and the Malay and Pacific Islds.

Stem 1–3 ft., branched below, leafy; nodes glabrous. *Leaves* 2–6 by ¼–⅓ in.,

thin, finely acuminate; margins and mouth of sheath ciliate; ligule rounded. *Panicle* 2–5 in., usually inclined with spreading glabrous or puberulous branches naked below, and very long distant spreading branchlets. *Spikelets* $\frac{1}{16}$ in. long.—Very variable in the size of the whole plant and of its leaves and panicle. The smaller forms agree with the specimens of *P. patens* in the Linnean Herbarium, and are Wallich's n. 8740, and n. 8738 C.; the larger are *P. accrescens* of Trinius (referred by himself to *obliquum*, Roth.), and are Wallich's 8738 A. B. D. A small variety? with larger spikelets, nearly $\frac{1}{12}$ in. long, occurs in the Nilghiris (*Herb. Wight* n. 3047); at Goodavery Ghats, *Lawson*; and in Ceylon, at Newera Elia (C.P. n. 886).

53. **P. longipes,** *Wight et Arn. in Wight Cat.* n. 1638; tall, leaves 4–10 in., panicle 5–10 in. fastigiately supra-decompound, branches and long pedicels capillary, spikelets $\frac{1}{12}$ in. glabrous, gl. I nearly = III ovate acuminate 3-nerved, II and III acute Aira capillaris, *Heyne in Herb. Rottler, & in Wall. Cat.*—Panicum, *Wall. Cat.* n. 8741.

Nilghiri and Pulney Hills, *Heyne*, &c.; Karkun Ghat, alt. 2000 ft., *Lawson.*

Stem 2–3 ft. and upwards, as thick as a crow-quill, quite smooth, base decumbent. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in. broad, finely acuminate, narrowed and sparsely hairy at the base, finely puberulous beneath; sheath nearly glabrous; ligule rounded. *Panicle* sub-fastigiately branched; branches simple sometimes naked below for an inch and more, then fastigiately branched. *Spikelets* pale brown; gl. II and III with sparingly ciliolate tips.—Distinguished from *P. patens* by the greater size, robuster habit, and much larger spikelets with acute glumes. What may be a small state of it was found at Golaghat, Seebsagur, by *Clarke.* Compare also the form of *P. patens* with larger spikelets.

54. **P. sparsicomum,** *Nees ex Steud. Syn. Gram.* 83; stem filiform diffusely branched, leaves 1–2½ in. softly pubescent, panicle effuse of few long capillary branches and branchlets, spikelets $\frac{1}{16}$ in. oblong glabrous, gl. I = $\frac{1}{2}$ III faintly 3-nerved, II longest and III ovate-lanceolate acute 5-nerved, IV thin pale. *Wight Cat.* n. 1635 (*name*). Agrostis zeylanica? *Herb. Wight.*; *Klein ex Steud. l. c.* 83.

Ceylon; Cookle or Cocklaj, Jan. 23rd, 1796, *Heyne in Herb. Rottl.*

Stems 6–18 in., almost capillary, rooting at the nodes. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in. broad, acuminate, hairy on both surfaces; sheaths and their mouths hairy. *Panicle* on a filiform peduncle, 3–4 in. long and broad. *Spikelets* few, distant; gl. IV not so strongly laterally compressed and gibbous as in its allies.—A very distinct species, I think, but not easily characterized.

Sect. IX. Pseudechinolæna. (See p. 28.)

55. **P. uncinatum,** *Raddi Agrost. Bras.* 41; *Trin. Gram. Panic.* 174, *Sp. Gram. Ic.* t. 216; *Kunth Enum. Pl.* i. 172; *Steud. Syn. Gram.* 60; *Thw. Enum. Pl. Zeylan.* 359; *Trim. Cat. Ceyl. Pl.* 105. P. echinatum, *Willd. ex Doell in Mart. Fl. Bras.* ii. II, 193. P. glandulosum, *Nees ex Trin. Gram. Panic.* 174. P. heteranthum, *Link Enum. Hort. Berol.* i. 212. P. nemorosum β, *Trin. l. c.* 174. P. Trinii, *Mor. Syst. Verz. Zoll.* 102 Echinolæna polystachya, *H. B. & K. Nov. Gen. & Sp.* i. 119, t. 679; *Kunth l. c.* i. 172, *Suppl.* 127. Cenchrus lappaceus, *Herb. Heyne.* ? Lappago aliena, *Spreng. Neue Entdeck.* iii. 15.—Echinolæna, *Wall. Cat.* n. 8661.

Eastern Himalaya; from Nepal to Sikkim, alt. 3–6000 ft. Khasia, Naga,

and MUNNEPORE HILLS, alt. 2–5000 ft. SOUTH DECCAN, on the Shivagerry Hills, *Wight*. CEYLON, common.—DISTRIB. Trop. Asia and America.

Perennial. *Stem* decumbent, straggling and branched below; branches 4–18 in., leafy, slender. *Leaves* 2–4 in., ovate-lanceolate, membranous, flat, base narrow oblique; sheath ciliate; ligule oblong, scarious. *Panicle* 1–3 in.; branches 2–6, distant, spiciform, flexuous, scaberulous. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., solitary or 2-nate, dimidiate-ovate; pedicels very short, uncinate, scabrid; gl. I oblong-lanceolate, acuminate, keeled, 3-nerved, tip scabrid; II gibbously cymbiform, acute, 7-nerved, pale dull red, hispid, hairs sometimes hooked; III broadly ovate, obtuse, 7-nerved, paleate, male, green, sides centre and obtuse tip broadly hyaline, lateral nerves approximate; IV cymbiform, shorter than III, laterally compressed, thinly coriaceous. *Lodicules* 0.

DOUBTFUL AND EXCLUDED SPECIES.

P. ABLUDENS, *Roem. & Schult. Syst.* ii. 457; *Roth Nov. Sp.* 53. P. ramosum, *Heyne mss. ex Roth l. c.* P. paradoxum, *Rottl. mss. ex Roem. & Sch. l. c.*, is evidently a *Paspalum*.

P. ACICULARE, *Desv. in Poir. Encycl. Suppl.* ii. 274; *Nees Agrost. Bras.* 235; *Kunth Enum. Pl.* i. 116; *Steud. Syn. Gram.* 82, is, I suspect, an American species, erroneously described as E. Indian. There is no Indian *Panicum* at all answering to it.

P. ANGUSTATUM, *Edgew. in Journ. Beng. As. Soc.* xxi. (1852) 157; *name only*.

P. ARANEOSUM, *Edgew.* in Index Kewensis, is an error for Pennisetum araneosum, *Edgew.* (= Penn. lanuginosum).

P. CONCINNUM, *Edgew. l. c.* 157, 179, 187; the description will apply to various species.

P. FESTUCOIDES, *Poir. Encycl. Suppl.* iv. 283; *Kunth Enum. Pl.* i. 131 is undeterminable.

P. FLEXUOSUM, *Retz. Obs.* iii. 9, and iv. 16; *Steud. Syn. Gram.* 83, described as an Indian Plant of Koenig's by Retz., is doubtfully referred to the Brasilian *Isachne ventricosa* by Doell in Mart. Fl. Bras. ii. II, 274. Retz describes it as being like *capillare*, Linn., but with the nodes bearded by reflexed hairs.

P. FUGAX, *Koen. in Naturf.* xxiii. (1788) 209; *Gmel. Syst.* 162; *Kunth l. c.* 134, is undeterminable.—Mr. Rendle informs me that this probably refers to a plant alluded to by Koenig in his correspondence (now in the British Museum) as "a decumbent *Panicum* growing in rice-fields, in which the panicle flowered almost before it had left the sheath, often a larva is found in the flower when the latter perishes otherwise it is caducous." A diseased Panicum (possibly *P. psilopodium*) bearing the name *P. insectiferum*, Koen. mss. in Herb. Mus. Brit. is presumably the plant.—I find diseased spikelets to be frequent in *P. psilopodium*.

P. HEYNII, *Roth Nov. Sp.* 49; *Kunth l. c.* 130; *Steud. l. c.* 80; branches of oblong panicle strict divided, base hairy, lowest whorled with fascicled flexuous scabrid branchlets, pedicels solitary alternate, gl. I cordate obtuse embracing the spikelet, leaves sharply serrate, margins and mouth of sheath hairy.

P. INFIDUM, *Steud. Syn. Gram.* 63, is probably a *Paspalum*.

P. KUNTHII, *Steud. Nom. Ed.* II, ii. 258. P. orthum, *Voigt Hort. Suburb. Calcutt.* 701; P. Pseudostricta, *Steud. Syn. Gram.* 39; Digitaria stricta, *Roth Nov. Sp.* 38; Setaria? stricta, *Kunth Revis. Gram.* i. 47, *Enum. Pl.* i. 157. I have failed to identify this plant. It is possibly a *Paspalum*.

P. REPENS, *Roxb. Ic. ined.* t. 111, 112, 796. Three plants of the section *Brachiaria* thus named are in Roxburgh's collection of drawings, none of them answering to his description of *repens* in Fl. Ind. (which I take to be *P. vestitum*), nor to the *P. repens*, Linn. All are represented as perfectly glabrous, with stem 12–18 in. high, creeping below; leaves flat, 4–5 in., strict, narrowed from a rounded base to the top; panicle 4–6 in.; spikes 10–20, 1–1½ in.; spikelets subsessile, about $\frac{1}{7}$ in., close set, sometimes obscurely paired, green; gl. I $\frac{1}{3}$ $\frac{1}{2}$ III, 5-nerved. In t. 111 the spikes are about 10, distichously spreading. In t. 112 there are about 20 dis-

tichously spreading spikes. In t. 796 there are 10, all secund. The grain of t. 111 is ovate-lanceolate, acuminate, with three dorsal lines; of t. 212 ovate-lanceolate, acuminate; of t. 796 elliptic-oblong, acute.—It is evident that in this as in other cases, Roxburgh had not named his Icones in accordance with the descriptions prepared for the "Flora Indica."

P. SERICEUM, *Soland. in Ait. Hort. Kew*, 88, is a West Indian plant erroneously entered as from "Ind. Or." by Steudel.

P. SIMPLICISSIMUM, *Koen. in Neue Schrift. Naturf.* xxiii. (1788) 209 (*ex Index Kewensis*). There is no such species described in the work cited, but Mr. Rendle has pointed out to me that at the bottom of the page Koenig mentions a very fine grass sent by him to Dr. Solander, adding, "Er hat eine Paniculam simplicissimam."

P. TENUE, *Roxb. Fl. Ind.* i. 310; stem 1–6 ft. erect, ramous, panicle thin, spikelets binate on a common hairy pedicel with unequal partial pedicels, gl. III paleate, grain ovate transversely waved.—Wild in the Circar Mts. (*Roxb.*).—*Stem* sometimes prostrate and rooting. *Leaves* large, upper surface hairy, margins with very sharp points; sheaths shorter than the internodes, hairy, mouths bearded. *Panicle* erect, till fruiting, then bowing as in *P. miliaceum*, of alternate compound nearly secund racemes; rachis 4–5-angled, branchlets 3-angled, flexuous hairy. *Spikelets* smooth, gls. many-nerved, III male in luxuriant plants.—I have altered Roxburgh's phraseology to bring it into harmony with that of this work. I have seen no plant answering to the above description except perhaps a small state of *P. maximum*.

P. TRACHYPUS, *Trin. Panic. Gen.* 170; rays subracemiform, shortly compound from the base alternate, raylets spreading, pedicels very short, spikelets lineal obovate submucronulate pubescent, gl. I 3-4 times shorter than the spikelet, 3-nerved, II 5-nerved, 4 mucronate rugose. Leaves glabrous lanceolate from a cordate base.—Nepal.

P. TRIFLORUM, *Edgew. in Journ. As. Soc. Beng.* xxi. (1853), 157, 179; *Duthie Grass. N.W. Ind.* 7, *Fodd. Grass. N. Ind.* 13; Edgeworth's description will apply to various species.

5. **ICHNANTHUS,** *Swartz.*

Annual or perennial branching grasses. *Leaves* broad. *Spikelets* 1–2-fld., long panicled, ovate or lanceolate, terete, articulate (but often persistent) on their pedicels. *Glumes* 4, I II and III subequal or II longest, strongly nerved; III paleate or not, male or neuter; IV much shortest, stipitate, paleate, bisexual, oblong or oblong-lanceolate, stipes with an anticous simple or 2-fid or 2 lateral appendages. *Lodicules* 2, minute. *Styles* free, exserted apically. *Stamens* 3. *Grain* coriaceous, acute or acuminate, polished, articulate at the base of the stipes.—Species about 20, tropical.

This genus differs from *Panicum* in the appendaged base of gl. IV.

1. **I. pallens,** *Munro in Benth. Fl. Hongk.* 414; stem slender elongate, leaves broadly lanceolate, panicle open, rachis and subsecund branches slender, gls. spreading, I ovate-lanceolate acuminate, III paleate neuter or male, IV when mature exposed, turned on one side, oblong obtuse, appendages 2 adnate to its sides. *Thw. Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 105. Panicum pallens, *Swartz Prodr.* 23, *Fl. Ind. Occ.* i. 164; *Kunth Enum. Pl.* i. 89; *Nees Agrost. Bras.* 137; *Trin. Sp. Gram Ic.* t. 211; *Griseb. Fl. Brit. W. Ind.* 550. P. vicinum, *Baily Syn. Queensland Fl.* iii. 82. Apluda Zeygites. *Aubl. Pl. Guian.* ii. 933 (*excl. Syn.*). ?Agrostis nutans, *Poir. Encycl. Suppl.* i. 255.

SIKKIM HIMALAYA; ascending to 3500 ft. KHASIA HILLS, alt. 1-4000 ft., ASSAM, and BENGAL.—CEYLON, alt. 4000 ft.—DISTRIB. Tropics generally.

Stem 1–2 ft., weak, decumbent; loosely branched, more or less pubescent. *Leaves* 3–6 by $\frac{1}{2}$–1 in., broadly-lanceolate, thin, flat, caudate-acuminate, scaberulous; base rounded or cordate, ciliate; sheath lax; ligule a few hairs. *Panicle* 3–4 in., unilateral; branches erect or spreading, and pedicels scaberulous. *Spikelets* $\frac{1}{5}$ in. long, green; gl. I–III persistent, keels scabrid; I more than $\frac{1}{2}$ III, ovate-lanceolate, subaristate, 3-nerved, II acuminate 5-nerved; III obtuse 5-nerved, palea large; IV = $\frac{1}{2}$ III deciduous, smooth, pale, turned half round so that the long diam. is at right angles to the plane of the spikelets; appendages obscure.—The oblique position of the grain is very peculiar.

2. **I. foliolosus**, *Munro in Herb. Kew*; dwarf, hispidly hairy, fastigiately branched from the base, leaves short almost subulate, spikelets $\frac{1}{6}$ in. in short panicles half immersed in the leafy tips of the short branches erect, gl. I nearly = III 5-nerved, II longer than III subaristate, III epaleate 5-nerved, IV ellipsoid acute, appendage minute anticous 2-lobed. Panicum foliolosum, *Wall. Cat.* n. 8680.

BURMA; Ava, *Wallich*; Mengoon, *J. Anderson.*

Densely tufted, 6–8 in. high, stiff, branches suberect or prostrate to the tips. *Leaves* 1–1$\frac{1}{4}$ by $\frac{1}{10}$–$\frac{1}{6}$ in., flat, strongly many-nerved, clothed like the short sheaths and panicles with spreading hairs; ligule of rigid hairs. *Panicles* with short erect angular branches. *Spikelets* green, tips scabrid; gl. IV much shorter than III, stipitate, base truncate.—A very peculiar species.

6. THYSANOLAENA, *Nees.*

A very large glabrous grass; stem solid. *Leaves* broad, flat. *Panicle* very large, effuse, with myriads of crowded long filiform compound suberect branches and branchlets bearing innumerable subsecund very minute 1-fld. spikelets which are jointed on very short pedicels. *Glumes* 4; I and II minute, concave, obtuse, awnless; I shortest nerveless; II nerveless; III much longer, epaleate, empty, coriaceous, acuminate, 1-nerved, hardening; IV rather shorter membranous, oblong, acute, clothed with white erect hairs, palea short, truncate. *Stamens* 2–3, anthers short. *Styles* free. *Grain* most minute, free within the hardened glumes.

T. Agrostis, *Nees in Edinb. new Phil. Journ.* xviii (1835) 180; *Steud. Syn. Gram.* 119. T. maxima, *Herb. O. Kuntze.* T. acarifera, *Arn. & Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 181; *Wall. Cat.* n. 8882; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 347; *Duthie Grass. N.W. Ind.* 13, *Fodd. Grass. N. Ind.* 21. Panicum acariferum, *Trin. Sp. Gram. Ic.* t. 87; *Baker Fl. Maurit.* 437; *Miq. Fl. Ind. Bat.* iii. 517. P. Amlisa, *Herb. Ham. ex Wall. l. c.* C. Myriachaeta arundinacea, *Zoll. & Mor. Syst. Verz. Zoll.* 101; *Steud. Syn. Gram.* 404. M. glauca, *Mor. ex Steud. l. c.* 404; *Zoll. Syst. l. c.* Melica latifolia, *Roxb. Fl. Ind.* i. 328. Agrostis maxima, *Roxb. l. c.* 317. A. latifolia, *Heyne in Herb. Rottl.* (*non Trevir.*). A. scoparia, *Koenig ex Herb. Rottl.* (*non Steud.*). Arundo montana, *Herb. Ham. ex Wall. l. c.* B.

SUBTROPICAL HIMALAYA, from Kumaon eastwards and the KHASIA HILLS, alt. 4 5000 ft. BEHAR; on Parus-nath. The DECCAN, BURMA; NICOBAR ISLES., and PENANG.—DISTRIB. Eastw. to New Guinea.

Stem 4-12 ft., sometimes as thick as the little finger. *Leaves* 1–2 ft. by 2–4 in., coriaceous, tapering to a fine point, base cordate; mouth of sheaths hairy; ligule

short, ciliate. *Panicle* 1–2 ft., soft, quite glabrous. *Spikelets* $\frac{1}{20}$ in., pale yellow, rather shining, very obscurely jointed on the pedicels which are jointed on the branches.—*Myriachaeta glauca*, Mor., was founded on the erroneous supposition that its gl. IV was hairless. The spikelets are sometimes viviparous.

7. CHAMAERAPHIS, *Br.*

Glabrous marsh or aquatic grasses. *Leaves* linear or lanceolate. *Spikelets* 1–2-fld., subsessile and subsecund on the branches of a simple panicle which are produced in an awn-like bristle beyond the terminal spikelet, obscurely articulate on their pedicels, narrowly lanceolate. *Glumes* 4, I very small, truncate, hyaline, nerveless; II longest, acuminate or narrowed into rigid awn, 5-many-nerved; III lanceolate acute or aristately acuminate paleate male or neuter; IV very small, oblong, hyaline, fem. or bisexual; palea hyaline. *Lodicules* of male fl. cuneiform. *Stamens* 3. *Styles* free. *Grain* linear-oblong, compressed, free within the gl.—Species 5–6, trop. As. and Austral.

Besides the spikelets on the branches of the panicle, there are often one or more on the peduncle below the panicle, which are appressed, and sometimes somewhat sunk in a groove of the peduncle. The species are very variable.

1. **C. spinescens,** *Poir Encycl.* ii. 189; stems elongate rather stout, panicle pyramidal or contracted, branches with one few or many spikelets each $\frac{1}{6}$–$\frac{1}{4}$ in., glume III aristately acuminate many-nerved, IV obtuse. *Benth. Fl. Austral.* vii. 499; *Trim. Cat. Ceyl. Pl.* 106. C. aspera, *Nees in Wall. Cat.* n. 8679; *Wight Cat.* n. 1655; C. paradoxa, *Poir. l. c.*, *Kunth Enum. Pl.* i. 148, *Suppl.* 105. C. spinosa, *Beauv. ex Schult. Mant.* ii. 253. Panicum asperum, *Koen. in Naturf.* xxiii. (1788) 209; *Wight ex Steud. Syn. Gram.* 49; *Thwaites Enum. Pl. Zeyl.* 426. P. spinescens, *Br. Prodr.* 193; *Kunth Enum. Pl.* i. 131. P. ischæmoides, *Heyne ex Wall. l. c.* P. squarrosum, *Lam. Encycl.* iv. 743; *Kunth Enum. Pl.* i. 131. Andropogon squarrosus, *Linn. Herb.* Echinochloe squarrosa, *Roem. & Sch. Syst.* ii. 479. Orthopogon squarrosus, *Spreng. Syst.* i. 307. Setaria longiflora, *Desv. Opusc.* 81.

Marwar; on Mt. Aboo, *King.* Banda, *Duthie.* Lower Bengal, *Roxburgh, Griffith,* &c. South Deccan Peninsula, *Heyne, Wight,* &c. Ceylon, *Ferguson Glennie.*—Distrib. China, Malaya, Australia.

Floating in much branched masses, with leafy stems 1–3 ft., and panicles 2–4 in. long, varying very much in the number and size of their spikelets. *Leaves* 1–3 in., and their somewhat inflated sheaths smooth or scaberulous. *Spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in. long.

Var. *Brunoniana*; spikelets one or two on the branches of the panicle $\frac{1}{4}$–$\frac{1}{2}$ in. long. Panicum Brunonianum, *Griff. Ic. Pl. Asiat.* t. 145 and 139, f. 107. P. (Chamaeraphis) intermedium, and Pseudoraphis Brunoniana, *Griff. Notul.* iv. 29. Holcus natans, *Herb. Roxb.*—Lower Bengal, *Roxburgh, Griffith.*—Tonkin, Australia.

Var. *depauperata*; slender, leaves very short, panicle short contracted, spikelets $\frac{1}{6}$ in. C. depauperata, *Nees in Wight Cat.* n. 1654; *Steud. Syn. Gram.* 49; *Trim. Cat. Ceyl. Pl.* 106. Panicum sordidum, *Thw. Enum. Pl. Zeyl.* 443.—Jheels of Bengal, the Deccan and Ceylon.

2. **C. gracilis,** *Hack. in Engl. Bot. Jahrb.* vi. 326; branches of panicle many simple with many minute spikelets $\frac{1}{10}$–$\frac{1}{6}$ in. long.

Lower Bengal; *Clarke.* Cachar, *Keenan.* Burma, *Kurz.*—Distrib. Tonkin.

Stems 6–8 in., decumbent and rooting at the nodes, geniculately ascending,

branches slender; internodes 1–2 in. *Leaves* 1–1½ by $\frac{1}{6}$–$\frac{1}{5}$ in., spreading, strict, linear, acute, striate, base rounded, glabrous or sparsely hairy; sheaths broad, loose, membranous, compressed, 2-auricled, glabrous; ligule short, hyaline, toothed. *Panicle* shortly exserted beyond the upper sheath, 1–2 in. long, rachis and erecto-patent subsimple branches capillary, smooth. *Spikelets* very shortly pedicelled, green or brownish; gl. I truncate; II straight, sometimes long-acuminate or almost beaked, glabrous or obscurely sparsely hairy, nerves close, strong; III $\frac{1}{3}$-$\frac{1}{2}$ shorter than II, subacute; IV about $\frac{1}{2}$ III.—Very near the Australian *C. abortiva*, Poir. (*C. spinescens* var. *parvispicula*, Benth.) which has a lax panicle with few branches and spikelets.

8. **SPINIFEX,** *Linn.*

Stout, rigid, bushy, polygamo-dicœcious grasses. *Leaves* long, rigid, involute. MALE SPIKELETS 2-fld., subsessile, articulate on rigid peduncled spikes, which are collected in umbels surrounded by spathaceous leafy bracts; glumes 4, membranous, not awned; I and II empty; III and IV paleate, triandrous. FEM. SPIKELETS collected in large globose heads of stellately spreading very long rigid rod-like rachides, surrounded by shorter subulate bracts; each spikelet solitary, and articulate at the very base of a rachis, lanceolate, 2-fld. *Glumes* I, II, III, as in the male, but larger; III paleate, empty or triandrous; IV fem. *Lodicules* 2, large, nerved. *Styles* long, free; stigmas shortly feathery. *Grain* free within the hardened glumes.—Species 4; an Indian and 3 Australasian.

S. squarrosus, *Linn. Mant.* ii. 300; glabrous, glaucous, leaves pungent, male spikes 2–3 in., spikelets distant, fem. spikelets concealed by the bracts. *Lamk. Illust.* t. 840; *Kunth Enum. Pl.* i. 175; *Wall. Cat.* n. 8631; *Steud. Syn. Gram.* 113; *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 106; *Elliott Fl. Adrh.* 163; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 339; *Duthie Grass. N.W. Ind.* 11; *Benth. Fl. Hongk.* 415; *Miq. Fl. Ind. Bat.* iii. 474. S. dioicus, *Ham. ex Pritz. Icon. Index*, 1058. Stipa littorea, *Burm. f. Fl. Ind.* 29. S. spinifex, *Linn. Mant.* i. 84. —*Rheede Hort. Mal.* xii. t. 75.

Sandy coasts of both PENINSULAS, BURMA, and CEYLON.—DISTRIB. Java, China.

A squarrose gregarious bush, several feet high and broad. *Leaves* 4–6 in.; sheaths often imbricating; ligule very short, hirsute. *Peduncles* of male 2–3 in.; scaberulous, tips naked, pungent. *Male spikelets* $\frac{1}{3}$–$\frac{1}{2}$ in.; gls. thin, all glabrous, I and II subequal, oblong-lanceolate, acuminate, 7–9-nerved, nerves scaberulous; III rather longer, 5-nerved, paleate; IV shorter, ovate-lanceolate, acuminate, 5-nerved; paleas of III. and IV. narrowly lanceolate, keels ciliate. *Fem. spikelets* $\frac{2}{3}$ in., narrowly lanceolate; gls. all glabrous, I oblong-lanceolate, acuminate, many-nerved, nerves scaberulous; II rather shorter, acute, 7-nerved; III like II, 5-nerved; IV ovate-lanceolate, abruptly narrowed above the middle and acuminate, 5-nerved; palea shorter but broader than the gl., acute, 2-nerved, keels smooth, style very long, branches slender.

9. **AXONOPUS,** *Beauv.*

Perennial grasses. *Spikelets* 2-fld., articulate with the pedicel, sessile or subsessile in whorled or digitate spikes, awned. *Glumes* 4, I shortest, ovate, acuminate or cuspidate, glabrous, 3-nerved; II ovate-lanceolate, acuminate or awned, 5-nerved, lateral nerves marginal villous; III oblong, acute, 5-nerved, paleate, male, palea very short 2-fid or 2-partite; IV = II,

oblong or ovate, coriaceous, narrowed into a straight subulate awn; palea oblong, coriaceous, 2-nerved. *Lodicules* cuneate. *Stamens* 3, anthers long. *Styles* distinct. *Grain* small, suborbicular, free within the glumes.

A natural genus, remarkable for the small cleft palea of gl. III. It was established by Beauvois on *Panicum cimicinum*, Retz, to which other grasses having no affinity with it were added. Kunth erred in taking up Beauvois *Urochloa* (which is *Panicum javanicum*, Poir) and placing *A. cimicinum* in it.

1. **A. cimicinus,** *Beauv. Agrost.* 12; leaves ovate or ovate-lanceolate, spikes subverticillate. Panicum cimicinum, *Retz. Obs.* iii. 9; *Rottl. in Neue Schrift. Ges. Naturf. Freund.* iv. (1803) 191, 194; *Roxb. Fl. Ind.* i. 295; *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104. P. conjugatum, *Dalz. & Gibs. Bomb. Fl.* 291. Urochloa cimicina, *Kunth Revis. Gram.* i. 31, ii. 56, t. 103, *Enum. Pl.* i. 74, *Suppl.* 56; *Dalz. & Gibs. Bomb. Fl.* 289. Coridochloa cimicina, *Nees in Edinb. N. Phil. Journ.* xv. (1833) 381. C. fimbriata, *Nees ex Wight Cat.* 1656; *Wall. Cat.* n. 8749; *Aitchis. Cat. Panjab Pl.* 158. Milium cimicinum, *Linn. Mant.* 184.

Throughout India, in the plains and lower hills, Burma, Penang and Ceylon. —Distrib. Malaya, China.

Stem 1–2 ft., tufted, stout or slender, erect, or decumbent and geniculate at the base, and leaves hirsute with long spreading white hairs, rarely glabrescent. *Leaves* 1–3 by $\frac{1}{2}$–1 in., acute or obtuse, flat, green, striate, ciliate, base deeply cordate, ligule obsolete. *Spikes* 3–8 in a whorl, 1–6 in. long; rachis filiform, simple or divided, scaberulous; flowerless below. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in. long, solitary or clustered, very shortly pedicelled, dorsally compressed, pale, rather shining; gl. I acuminate; II mucronate or shortly awned; III acute; IV with a setiform awn.

2. **A. semi-alatus,** *Hook. f.*; leaves long linear, spikes few subdigitate. Panicum semi-alatum, *Br. Prodr.* i. 192; *Benth. Fl. Austral.* vii. 472; *Thw. Enum. Pl. Zeyl.* 358; *Trim. Cat. Ceyl. Pl.* 104. P. viaticum, *Griff. Ic. Pl. Asiat.* t. 145, f. 2. Bluffia Eckloniana, *Nees in Lindl. Introd. Nat. Syst. Ed.* II 447. Coridochloa semi-alata, *Nees in Edinb. New Phil. Journ.* xv. (1833) 381. Urochloa semi-alata, *Kunth Revis. Gram.* i. 311, *Enum. Pl.* i. 74. Oplismenus semi-alatus, *Desv. Opusc.* 81. Arundinella Schultzii, *Benth. l. c.* 545. Aira viatica, *Griff. Notul.* iii. 54. Holosetum philippinense, *Steud. l. c.*—Coridochloa, *Wall. Cat.* n. 8758.

Subtropical Himalaya, alt. 4–6500 ft., from Kumaon to Sikkim. The Khasia Hills, alt. 4–5000 ft.; Munnepore; Burma, *Collet*; Behar on Parusnath 3–5000 ft. Ceylon up to 5000 ft.—Distrib. Mauritius, S. Africa, China, Philippines, Australia.

Stems 1–3 ft., densely tufted, bases thickly clothed with the woolly remains of old leaf-sheaths. *Leaves* 8–12 by $\frac{1}{6}$–$\frac{1}{4}$ in., glabrous or pubescent, finely acuminate; ligule obscure. *Spikes* 2–5, 3–6 in. long; rachis slender subflexuous, smooth or hairy. *Spikelets* $\frac{1}{4}$ in., pale or brown, solitary or in distant pairs, sessile or pedicelled.

10. TRICHOLÆNA, *Schrad.*

Erect, tufted, annual or perennial grasses. *Leaves* narrow. *Spikelets* 1–2 fld., articulate on their pedicels, panicled, laterally compressed, clothed with long silky hairs, callus stipitiform. *Glumes* 3 or 4, I if present very small, often inserted much below III; II and III subequal, membranous, broadly ovate, mucronate or awned, dorsally rounded; III paleate, triandrous; IV very thin, shining, fem. or bisexual. *Lodicules* 2, minute, dolabriform. *Grain* loose within the gls.—Species many, chiefly S. African.

A genus the characters of which cannot be satisfactorily determined till a great many indetermined species are examined. It differs from *Panicum* in the villous or silky awned spikelets with membranous glumes. The two Indian species differ remarkably in the form of gl. IV.

1. **T. Teneriffæ,** *Parlat. in Webb & Berth. Phyt. Canar.* iii. 425. *Fl. Ital.* i. 130; perennial, gl. I minute or obsolete, IV sessile ovate-lanceolate acuminate margins incurved. T. micrantha, *Schrad. in Sch. Mant.* ii. 163; *Nees in Ann. Sc. Nat. Ser.* II vi. (1836) 106. Panicum plumosum, *Presl Fl. Sic.* i. 43. P. saccharoides, *Trin. Gram. Panic.* 245. P. Teneriffæ, *Br. Prodr.* 189; *Kunth Enum. Pl.* i. 98, *Suppl.* 75. P. villosum, *Presl Gram. & Cyp. Sic.* 18. Saccharum Teneriffæ, *Linn. f. Suppl.* 106; *Jacq. f. Eclog. Gram.* 51, t. 34 (*excl. Syn.*); *Biv. Bern. Stirp. Sic. Rar.* iv. 5, t. 1. *Sibth. Fl. Græc.* i. t. 53 (*excl. Anal.*). Agrostis plumosa, *Ten. Fl. Nap. Prodr. Suppl.* i. 59.

Western Panjab, *Falconer*; alt. 3500 ft., *Stewart.* SCIND, *Stocks.*—DISTRIB. Westward to Sicily and N. Africa.

Stems many from a woody stock, geniculate below, slender, rigid. *Leaves* very slender, convolute, rigid, glabrous; mouth of sheath bearded; ligule, a narrow membrane. *Panicle* 2–4 in. rather open, branchlets and pedicels capillary. *Spikelets* $\frac{1}{10}$–$\frac{1}{6}$ in., white or purplish, silky with spreading hairs; gls. II and III ovate acute or mucronate, concave; IV articulate at the base, white or brown, shining.

2. **T. Wightii,** *Nees & Arn. ex Steud. Syn. Gram.* 93; annual, gl. I very small linear, IV ellipsoid obtuse convolute. *Nees in Wight Cat.* n. 2345; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 347. T. micrantha, *Schrad. in Sch. Mant.* ii. 163; *Schmidt Beitr. Fl. Cap. Verd.* 153. T. tuberculosa, *Hack. mss.* Rhynchelytrum Wightii, *Duthie Fodd. Grass. N. Ind.* 21. Panicum megalanthum, *Steud. Syn. Gram.* 93. Saccharum Teneriffæ, *Parl. in Hook. Niger Flora*, 183 (*excl. Syn.*). Aira chinensis, *Retz. Obs.* iii. 10.—Tricholæna, *Wall. Cat.* n. 8660.

RAJPOOTANA; Ajmeer and Oodeypore, *Duthie.* The DECCAN, *Heyne, Wight.*—DISTRIB. Arabia, Cape Verd Islds.

Stems 6–18 in., tufted, stout or slender. *Leaves* 1–3 in., linear, acuminate, flat, and sheaths glabrous or hairy; ligule obsolete. *Panicle* 2–4 in., very narrow; branches and pedicels capillary, flexuous. *Spikelets* very variable in size, $\frac{1}{6}$–$\frac{1}{3}$ in. long; stipitiform callus gibbous, bearded; gl. I $\frac{1}{12}$–$\frac{1}{10}$ in. linear-oblong, obtuse, concave spreading; II and III tumid below, subrostrate, awned below the acute or obtuse tip, nerves smooth or tubercled; awn very slender, not twisted, longer than the gl. or shorter, palea of III narrow, keels ciliate; IV very thin, margins often overlapping.—The great variability in the size of the spikelets is very deceptive. It is not known where in the Deccan Heyne's and Wight's specimens were collected.

11. OPLISMENUS, *Beauv.*

Weak grasses; stems decumbent below, leafy. *Leaves* thin, flat, ovate to lanceolate; ligule a ridge of hairs. *Spikelets* 1-fld., sessile or subsessile, fascicled on a simple terminal spike or on panicled spikes. *Glumes* 4, I short, 3-nerved, long-awned, awn straight; II short, awn short or 0; III longest, 5-nerved, paleate or not, empty; IV lanceolate, terete and with its palea hardened. *Stamens* 3, anthers linear. *Styles* distinct. *Grain* free within the glumes.—Species few, very variable.

Of the 30 or more reputed species of *Oplismenus*, *Burmannii* and *compositus* seem

to be the most distinct, for *undulatifolius*, though constant over wide areas, is only a form of *compositus* with the branches of the panicle represented by one or a few sessile or subsessile spikelets.

1. **O. undulatifolius,** *Beauv. Agrost.* 54; spikelets solitary or clustered in a simple terminal spike. *Kunth Revis. Gram.* i. 44, *Enum. Pl.* i. 139, *Suppl.* 101; *Parlat. Fl. Ital.* i. 123; *Boiss. Fl. Orient.* v. 442; *Franch. & Sav. Fl. Japon.* ii. 654; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 28; *Duthie Grass. N.W. Ind.* 8. O. acuminatus, *Nees ex Steud. Syn. Gram.* 45. O. æmulans, flaccidus & imbecillis, *Roem. & Sch. Syst.* ii. 487. O. æmulus, *Kunth Revis.* i. 44. O. latifolius (*error for* undulatifolius) *Herb. Strach. & Winterb.*; *Aitchis. Cat. Panjab Pl.* 161; *Duthie l. c.* 8. O. parvifolius, *Kunth* 45. O. setarius, *Roem. & Sch. l. c.* Orthopogon gonyrrhizus, *Miq. Fl. Ind. Bat.* iii. 443; Orth. hirtellus, æmulus & flaccidus, *Br. Prodr.* 194. Orth. setarius, *Spreng. Syst. Veg.* 306; *Griseb. Fl. Brit. W. Ind.* 545. Orth. undulatifolius, *Spreng. Syst.* i. 306; *Reichb. Fl. Germ. Excurs.* i. 23, *Ic. Fl. Germ.* i. t. 28. Orth. undulatus, *Link Hort. Reg. Berol.* i. 203. Panicum barbifultum, *Hochst. Pl. Hohenack.* n. 1279, *ex Schlecht. in Linnæa*, xxxi. 307. P. Burmanni, *Schrenk Pl. Exsicc. Cent.* iii. n. 68; *Balb. Misc. Bot.* i. 8. P. gonyrrhizum, *Steud. l. c.* 44. P. hirtellum, *All. Fl. Pedem.* ii. 240. P. imbecille, *Trin. l. c.* t. 191; *Wulf. in Jacq. Collect.* i. 263; *Schrad. Fl. Germ.* i. 242. P. setarium, *Lamk. Ill.* i. 170; *Poir. Encycl.* iv. 741; *Pers. Syn.* i. 82. P. undulatifolium, *Arduin. Sp. Alt.* 14, t. 4; *Gaud. Agrost. Helvet.* i. 28; *Trin. Sp. Gram. Ic.* t. 192; *Koch Syn. Fl. Germ. Ed.* ii. 892. ? Setaria hirtella, *Schult. Mant.* ii. 276.

Temperate Himalaya, alt. 6–9000 ft., from Kashmir to Sikkim. Khasia Hills, alt. 4–5000 ft., Nilghiri Hills.—Distrib. Central and S. Europe, warm regions generally.

Stem 1–2 ft., usually very slender, simple or branched below. *Leaves* 1½–6 by ⅛–1 in., from ovate to narrow lanceolate, finely acuminate, glabrous or sparsely hairy; sheaths glabrous or hirsute. *Spike* 2–5 in.; rachis glabrous or pilose with spreading hairs; lower clusters of spikelets rarely produced into a very short spike. *Spikelets* ⅛–⅕ in. (excl. awns), solitary with a second reduced to an awn, or clustered, glabrous or nearly so. *Gl.* I 3-nerved, ciliate; awn ⅔ in. or less; II usually awned, 5-nerved; III acute or shortly awned, 7-nerved, palea narrow or 0.—Though as observed under the genus, this grass is only a form of *compositus*, it keeps its characters of the inflorescence throughout its distribution, and may hence be regarded as distinct. The Nilghiri form (*acuminatus*, Nees) has very narrow leaves, 3–4 by ⅛–¼ in. It is remarkable that no specimen of this species should exist in the Wallichian Herbarium.

2. **O. compositus,** *Beauv. Agrost.* 54; stem usually tall from a decumbent base, leaves 2–7 in. lanceolate, spikes 4–10 1–6 in. long or more, spikelets usually loosely imbricate, awns rather stout pale or dark. *Kunth Enum. Pl.* i. 141; *Trin. Sp. Gram. Ic.* t. 188, 189, 190; *Benth. Fl. Austral.* vii. 491; *Trim. Cat. Ceyl. Pl.* 105; *Aitchis. Cat. Punjab. Pl.* 161; *Duthie Grass. N.W. Ind.* 81. O. brasiliensis, *Raddi Agrost. Bras.* 40. O. bromoides, *Baker in Journ. Linn. Soc.* xxi. (1885) 452. O. Burmanni, *Thw. Enum.* 358; *Hochst. Pl. Hohen.* n. 368 (*non Beauv.*). O. decompositus, *Nees in Endl. Prodr. Fl. Norfolk.* 19. O. elatior & loliaceus, *Beauv. l. c.*; *Kunth l. c.* 142. O. hirtellus, *Roem. & Sch. Syst.* ii. 481. O. indicus, *Willd. in Act. Acad. Nat. Cur.* iv. 224. O. Jacquini, *Kunth Revis. Gram.* i. 44, 45, *Enum.* i. 140, 146. O. lanceolatus, *Kunth ll. cc.* 45, 146; *Wall. Cat.* n. 8676; *Dalz. & Gibs. Bomb. Fl.* 292. O. latifolius, *Hænke ex Steud. Nom.*

Ed. II ii. 220. O. pratensis, *Schult. Mant.* ii. 597. O. sylvaticus, *Roem. & Sch. l. c.* 481; *Kunth Revis.* i. 44, *Enum.* i. 139, *Suppl.* 101. Orthopogon compositus, *Br. Prodr.* 194; *Miq. Fl. Ind. Bat.* iii. Orth. Junghuhnii, *Nees ex Miq. l. c.* 444. Orth. longeracemosus & sylvaticus, *Miq. l. c.* Orth. pratensis, & loliaceus, *Spreng. Syst.* i. 306. Orth. remotus, *Trin. Fund. Agrost.* 181. Panicum aristatum, *Retz. Obs.* v. 17. P. bidentatum & certificandum, *Steud. l. c.* 44, 45. P. compositum, *Linn. Sp. Pl.* 57; *Trin. Sp. Gram. Ic.* t. 187; *Steud. l. c.* 44; *Thw. Enum. Pl. Zeyl.* 379; *Benth. Fl. Hongk.* 411; *Baker Fl. Maurit.* 439. P. composito-proximum, *Rottl. Ges. Naturf. Fr. Neue Schrift.* iv. (1804) 224. P. elatius, *Linn. f. Suppl.* 107. P. lanceolatum, *Retz. Obs.* v. 17; *Roxb. Fl. Ind.* i. 294; *Steud. l. c.* 48. P. longeracemosum, *Steud. l. c.* 45. P. peninsulanum, *Steud. l. c.* 44. P. sylvaticum, *Lamk. Encycl.* iv. 733; *Trin. Sp. Gram. Ic.* t. 190 A.; *Steud. l. c.* 45. P. undatum, *Steud. Nom. Ed.* II. ii. 264. P. unguinosum, *Herb. Banks ex Roxb. Fl. Ind.* i. 294. Echinochloa lanceolata, *Roem. & Sch. l. c.* 476. PE. hirta, *Schult. Mant.* ii. 270. Hekaterosachne elatior, *Steud. l. c.* 118. Digitaria composita, *Willd. Enum. Berol.* i. 91. Andropogon undatus, *Jacq. Coll.* iii. 237, t. 631.—Orthopogon sp. *Griff. Notul.* iii. 43.

Throughout INDIA, from Kashmir to Upper Assam, Munnepore, and Burma (up to 8,000 ft. in Sikkim) and southward to the Andaman and Nicobar Islds., Penang and CEYLON.—DISTRIB. most trop. regions (except Australia).

Stem 1–3 ft., stout or slender, branched from the base and sometimes upwards. *Leaves* very variable, $1\frac{1}{2}$–$1\frac{1}{4}$ in. broad; sheaths glabrous, pilose or hirsute. *Racemes* 2–6 in., stout or slender; rachis glabrous, pilose or hispid; spikes $\frac{1}{2}$–3 in. long, erect or spreading, green or purplish. *Spikelets* $\frac{1}{6}$–$\frac{1}{8}$ in. (excl. awns) solitary or in rather distant pairs or fascicles, appressed to the rachis or spreading, glabrous or with few or many bristles longer than the glumes at the base, rarely softly hairy; gls. pale green or reddish purple, I short, 3-nerved, ciliate, awn $\frac{1}{4}$ in. to nearly $\frac{3}{4}$ in., slender flexuous, pale yellowish or dark stouter and stiff; II longer or shorter than I, 5–7-nerved, acute, awn much shorter than of I or 0; III longer and broader than II; III acute or obtuse, 7–9-nerved, tip hispid, palea narrow or 0; IV lanceolate, terete, acuminate, and its hardened palea yellowish shining.—I am unable to group the Indian form of this most variable grass under practicable varieties. The following are indications of prevalent states, of which 6 is very aberrant.

1. Tall, stout, leaves 4–6 in., sheaths glabrous or hirsute, spikes and stout rachis of panicle more or less hirsute with long cilia, stout dark purplish awns often black. *Wall. Cat.* 8676 D. G. A. (*left-hand specimen*). Pan. elatius, *Heyne &* P. decompositus, *Nees, in Herb. Wight* n. 222, 1651. Andropogon undatus, *Jacq.*—Sikkim, Assam, Silhet, Burma and the Deccan.

2. Dwarf, branches short stout decumbent, leaves $\frac{3}{4}$–1 in. ovate green or purplish, sheaths hirsute, panicle erect, spikes erect stout glabrous or pubescent, and spikelets green or purple, awns short $\frac{1}{6}$–$\frac{1}{4}$ in. stout.—Oudh forests, Assam, Chittagong.

3. Slender, leaves 2–3 in., ovate-lanceolate, sheaths hirsute, panicle long very slender drooping rachis and very slender spikes finely pubescent, spikelets distant subsilky, awns very slender.—Sikkim alt. 1–3000 ft. Munnepore 4750 ft.

4. Tall, stout and much branched, or slender, leaves 4–7 in. lanceolate, sheaths glabrous, spikes many long stout or slender erect or drooping, rarely dark-colrd., spikelets rather distant very many glabrous or sparingly setose at the base, awn stout or slender. O. lanceolatus, *Kunth, Wall. Cat.* 8676 A. B. C. H. L. O. compositus, *Kunth*, &c.—The commonest form.

5. Same as 4, but always slender, with glabrous sheaths and rachis of panicle, fewer very slender smooth spikes, with few distant quite glabrous spikelets, awns slender pale. O. indicus, *Wight Herb.* n. 63, 1652 and lanceolatus, n. 2332. O. lanceolatus, *Wall. Cat.* 8676 E. F. M.—A reduced form of 4, and quite as common.

6. Slender, diffusely branched below; spikes few, distant, very slender; spikelets few, silkily villous, pale green, gl. I 3–5-nerved; II 5–7-nerved; III 7–9-nerved, its palea narrow tip ciliate.—Of this there are three forms or varieties, *a*, stem 2 ft., rather stout, leaves 3–4 in. linear-lanceolate, spikes 2–3 in., awns ⅓ in.—Penang, *Curtis*, n. 1102.—*b*, Very slender, leaves 1–1½ in., awns shorter. O. indicus, *Wight Cat.* n. 1652.—Ceylon, *Thwaites* (CP. 3963)—*c*. very slender, leaves ¾–1 in., spikes 2–3, short, gl. I as long as its awn.—Ceylon, *Thwaites* (CP. 3964).

3. **O. Burmannii,** *Beauv. Agrost.* 54; decumbent, flaccid, leaves ½–1 in., spikes 3–5 short, spikelets secund closely imbricate awns pale capillary. *Roem. & Sch. Syst.* ii. 484. *Kunth Revis. Gram.* i. 44, *Enum.* i. 139, *Suppl.* 101; *Trin. Sp. Gram. Ic.* t. 193; *Dalz. & Gibs. Bomb. Fl.* 291; *N.E. Br. in Gard. Chron.* (1886) ii. 776; *Franch. & Sav. Enum. Pl. Jap.* ii. 160; *Wight Cat.* n. 1650; *Duthie Grass. N.W. Ind.* 8, *Indig. Fodd. Grass.* t. 47, *Fodd. Grass. N. Ind.* 13. O. africanus, *Beauv. Fl. Owar.* ii. 15, t. 68, f. 1; *Kunth Enum.* i. 141. O. albus, *Roem. & Sch. Syst.* ii. 890. O. brasiliensis, *Raddi Agrost. Bras.* 400. O. bromoides, *Beauv. Agrost.* 54; *Bojer Hort. Maurit.* 366. O. Humboldtianus, *Nees Agrost Bras.* 264; *Presl Rel. Hænk.* i. 322. ?O. indicus, *Roem. & Sch. l. c.* 484; *Duthie Grass. N.W. Ind.* 8. Orthopogon Burmanni, *Br. Prodr.* 194; *Miq. Fl. Ind. Bat.* iii. 442; *Reichb. Ic. Fl. Germ.* i. t. 28. Orth. albus, *Nees ex Steud. l. c.* 44; *Miq. l. c.* Panicum Burmanni, *Retz. Obs.* iii. 10; *Roxb. Fl. Ind.* i. 298; *Trin. Sp. Gram. Ic.* t. 193; *Baker Fl. Maurit.* 438. P. album & africanum, *Poir. Encycl. Suppl.* iv. 274, 275. P. bromoides, *Lamk. Ill.* i. 170, *Encycl.* iv. 742. P. hirtellum, *Burm. Fl. Ind.* 24, t. 13, f. 1 (*non Linn.*); *Steud. l. c.* 44. P. japonicum, *Steud. in Flora* xxix. (1846) 18. P. multisetum, *Hochst Pl. Schimp. Abyss.* n. 1469; *A Rich. Tent. Fl. Abyss.* ii. 377. Echinochloa hirtella, *Schult. Mant.* ii. 269.—Oplismenus, *Wall. Cat.* 8677, 8678.

Plains of India, from Rohilkund to Bengal, Silhet and Chittagong, ascending the Himalaya in Sikkim to 5000 ft. Behar and Central India, Ceylon, Jaffna (Herb. Rottl.); *Ferguson.*—Distrib. Malay Islds., China, Japan, Afr. trop.

Diffusely branched and rooting below, stems often almost filiform. *Leaves* always small, sheaths glabrous or hairy. *Panicle* 1–4 in., inclined or nodding; spikes rarely 1 in., very pale, rachis glabrous or pubescent. *Spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in. (excl. awns); gl. I ciliate, 1–3-nerved, awn ⅓ in. or less; II 3–5-nerved, awned; III 5–9-nerved, shortly awned, palea 0.—Usually very distinct from *O. compositus*, but I have found specimens growing in the Jheels, with spikes nearly two inches long and stouter awns, forming a transition to that plant. Wall. Cat. 8678 is a very small Silhet form, with ovate leaves ¼–½ in. Clarke found it also in Silhet.—*O. africanus* is the earliest name for the species under *Oplismenus*, but *Burmannii* is of universal adoption, and is the earliest specific name; both were given by Beauvois, *O. africanus* in 1807, *O. Burmannii* in 1812.

DOUBTFUL SPECIES.

O ? dubius, *Kunth Revis. Gram.* i. 44; *Enum. Pl.* i. 143.

12. ARUNDINELLA, *Raddi.*

Annual or perennial erect grasses. *Leaves* narrow. *Spikelets* panicled, not jointed on the pedicels, 1–2-fld. *Glumes* 4, membranous or subcoriaceous, I ovate acute or acuminate, rather shorter than II, 3 or 5-nerved: II lanceolate or ovate-lanceolate, acuminate or subaristate, 5-rarely 7-nerved;

III equalling I or rather longer, oblong, subacute or narrowly truncate 5- or 7-nerved, paleate, triandrous or neuter; IV much the smallest, bisexual, articulate at the base and deciduous, membranous and oblong in flower, lanceolate subcoriaceous and scaberulous when mature, and awnless or with one terminal subgeniculate awn more or less twisted at the base, and with sometimes 2 lateral shorter capillary awns; base usually bearded. *Anthers* long. *Styles* 2, free or connate below; stigmas long. *Grain* free within gl. IV.—Species about 30, tropical.

A very well marked genus, referred by Baillon (Bull. Soc. Linn. Paris (1893) 1023, 1083, 1093) to *Panicum*, from which it differs in the inarticulate spikelets with the small thin gl. IV articulate at the base, as also in gl. IV being awned in many species and bearded at the base. The species are most difficult of determination, the Peninsular especially, which have not been so collected as to provide sufficient material for satisfactory study. I greatly doubt the value of the characters afforded by the awns.

* Gl. IV with 3 awns, the lateral short, capillary. (MILIOSACCHARUM, *Nees.*)

1. **A. avenacea,** *Munro ex Thw. Enum. Pl. Zeyl.* 362; annual, leaves short, panicle ½–1 in. ovoid compact, spikelets ⅛–¼ in. subsessile, gl. I and II awned, III awned acuminate, IV hispid or bearded, median awn flattened and strongly twisted at the base. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 345; *Trim. Cat. Ceyl. Pl.* 106. A. Campbelliana, *Lisboa l.c.* 346. Avena malabarica, *Heyne ex Herb. Rottl.*—Arundinella? *Wall. Cat.* 8670.—Aira, No. 3, *Griff. Notul.* iii. 55, *Ic. Pl. Asiat.* t. 146, f. III.

KHASIA HILLS, in wet places, alt. 3–4000 ft. *Griffith*, &c. DECCAN PENINSULA, from the Concan southward. BURMA; Pegu, *Kurz*; Moulmein, *Griffith.* CEYLON, in swamps, at Ratnapoora, *Thwaites.*

A weak straggling slender grass. *Leaves* 1–2 in., ovate-lanceolate, acute, glabrous or pilose, base amplexicaul and subpectinately ciliate; sheaths slender; ligule membranous, ciliate. *Panicle* pale green, branches short glabrous or hairy. *Glumes* I and II glabrous hairy or with tubercled-based bristles; I 3-5-nerved; II ¼ longer, 5-nerved; III acute or acuminate, 5-nerved, paleate, male or neuter; IV linear-oblong, more or less hispidly pilose or with lateral beards, base with long hairs; lateral awns triangular at the base, median about twice as long as the spikelet, geniculate above the twisted portion.

2. **A. tuberculata,** *Munro ex Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 344; annual, erect, hispid with long white tubercled-based hairs, panicle lax, spikelets ⅛ in. shortly pedicelled, gl. I 3-nerved shortly awned, II nearly twice as long 5-nerved narrowed to a long beak, III male obtuse, IV glabrous, median awn slender twisted or not below.

The CONCAN; Poona, *Stocks*, &c. CENTRAL INDIA, *King.*

Stem 12–18 in., sheaths leaves and panicle clothed with white spreading stiff hairs. *Leaves* 1–3 in., linear-lanceolate, base rounded; ligule a ridge of hairs. *Panicle* 3–6 in., narrowly oblong; branches ½–1 in., suberect, scaberulous. *Spikelets* ovoid, single or geminate, beak of gl. II as long as the rest of the gl.; III as long as I, narrow, glabrous, 5-nerved; IV lanceolate, scabrid when ripe, base pilose, median awn about twice as long as the spikelet, lateral acicular.

3. **A. mesophylla,** *Nees ex Steud. Syn. Gram.* 115; *Nees & Arn. ex Wight Cat.* n. 2347; annual, erect, pubescent or hirsute, leaves narrow, branches of compressed panicle spiciform short simple, spikelets sessile imbricate sub 4-ranked bifarious, gl. I. subawned 3-nerved, II rather longer

5–7-nerved, narrowed into a long beak, III obtuse male, IV lanceolate base pilose, median awn about $\frac{1}{3}$ longer than the spikelet slender hardly twisted.—Arundinella, *Wall. Cat.* n. 8663 B.

TRAVANCOR; Pulney Mts. and Courtallam, *Wight.*

Stem 1–2 ft., branching from the base, slender. *Leaves* 3–4 by $\frac{1}{6}$–$\frac{1}{4}$ in., base narrowed; ligule obscure. *Panicle* 2–4 in., hirsute, branches $\frac{1}{2}$–$\frac{3}{4}$ in., sessile (i.e. flowering to the base), rachis hairy; spikelets distichously spreading. Gl. I hardly awned, ovate; II about $\frac{1}{4}$ longer, lanceolate; III glabrous, narrowly oblong; IV not seen ripe, base bearded.

4. **A. nervosa,** *Nees in Wall. Cat.* n. 8662; annual, leaves narrow, softly hairy with spreading hairs, panicle much branched, branches capillary laxly many-fld., spikelets $\frac{1}{6}$ in. pedicelled, gl. I acuminate 3-nerved, II nearly twice as long 5-nerved narrowed into a long straight beak, III obtuse, IV ovate-lanceolate scaberulous, median awn slender. *Steud. Syn. Gram.* 115; *Wight Cat.* n. 2387, 1669 *a* β γ. Holcus nervosus, *Roxb. ex Wight Cat.* n. 1669 (*non Roxb. Fl. Ind.*) Ischæmum melicoides, *Koen. ms in Herb. Wight.* Andropogon hirsutum & scoparium, *Heyne in Herb. Rottl.* Agrostis scoparia, *Koen. ex Steud. l. c.* Anemagrostis Neesiana, *Wight & Arn. ex Steud. l. c.*—Arundinella, *Wall. Cat.* n. 8665.

SOUTHERN DECCAN PENINSULA; *Heyne, Wight,* &c.

Stem 12–18 in., slender, branched from the base. *Leaves* 4–8 by $\frac{1}{6}$–$\frac{1}{3}$ in., and sheaths usually copiously hairy on both surfaces with long white spreading hairs, base narrow; ligule membranous, ciliate. *Panicle* 6–10 in.; branches 2–4 in., fascicled and whorled, erect, flexuous, smooth, glabrous. *Spikelets* suberect, glabrous or nerves of gl. I and II more or less setose; gl. III neuter or male; IV slightly bearded at the base, median awn more or less twisted at the very slender base.—Wight's β *laxior* (Cat. 1669 *b*) is only a slender form.—Lisboa (*in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 344) gives Concan, Coromandel and Ceylon as habitats, but without seeing specimens it is not safe to cite an authority in so difficult a genus. *A. nervosa, Duthie Grass. N.-W. Ind.* 13, from the Himalaya is probably one of the forms of *brasiliensis.*

5. **A. setosa,** *Trin. Diss.* ii. 63, *Panic. Gen.* 245; perennial, tall, leaves usually narrow, panicle 6–12 in., branches subsolitary slender erect laxly many-fld., spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. subsecund pedicelled, gl. I and II aristately acuminate glabrous or setose, I = $\frac{2}{3}$–$\frac{3}{4}$ II 3-nerved, II elongate lanceolate 5-nerved, III shorter obtuse or subacute 5–7-nerved, IV = $\frac{1}{2}$ III lanceolate scaberulous. *Steud. Syn. Gram.* 114; *Duthie Grass. N.W. Ind.* 13. A. hirsuta, *Nees ex Steud. l. c.* 115, *& Hochst. in Hohen. Pl. Ind. Or.* n. 920. A. setifera, *Steud. l. c.* 115. A. stricta, *Nees in Hook. Kew Journ.* ii. (1850) 102; *Dalz. & Gibs. Bomb. Fl.* 292. Milium cimicinoides, *Roxb. mss.*—?Arundinaria sp. nov. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 343.

WESTERN HIMALAYA; alt. 5–8000 ft., from Dalhousie to Nepal, *Wallich,* &c. KHASIA HILLS, alt. 3–6000 ft. BEHAR, on the Soane river, *J. D. H.* CENTRAL INDIA, *Clarke.* NILGHIRI HILLS, alt. 6000 ft., *Schmidt,* &c. CEYLON; at Trincomalee, *Ferguson.*—DISTRIB. Tonkin, China, Philippines.

Stems densely tufted on a hard rootstock, 1–3 ft., stout or slender, leafy. *Leaves* 6–10 in., convolute, glabrous pubescent or villous; ligule obscure. *Panicle* 2–6 in., sometimes corymbiform; branches 2–5 in., usually naked below. *Spikelets* often in pairs, pedicels with sometimes a few hairs near the tip. *Median awn* of gl. IV about as long as the spikelet.—The name *hirsuta* is attached to a specimen in Herb. Royle, so named no doubt by Nees.

6. **A. khaseana,** *Nees ex Steud. Syn. Gram.* 115; tall, robust, leaves narrow, panicle 6–18 in. branches long or short erect scabrid, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. setose with long tubercled based bristles, gl. I and II aristately acuminate, I = $\frac{3}{4}$ II 5-nerved, II 5-nerved, III acuminate or subaristate, IV oblong-lanceolate nearly smooth. Arundinella? *Wall. Cat.* n. 8672.

Khasia Hills; alt. 4–6000 ft., common.

Stem 3–6 ft., from a woody tufted rootstock, as thick as a swan's quill or less, nodes pubescent or bearded. *Leaves* 6–12 in., and sheaths glabrous pilose or villous; ligule a ridge of hairs. *Panicle* effuse or contracted or thyrsiform; branches 1–6 in. long. *Spikelets* pedicelled, crowded or distant, dark green; gl. IV. with the median awn variable in length, strongly twisted at the stout base, lateral awns short.

** Awn solitary, longer than the spikelet.

† *Spikelets about* $\frac{1}{12}$—$\frac{1}{10}$ *in. long.*

7. A. agrostoides, *Trin. Sp. Gram. Ic.* t. 265; annual, villous or glabrescent, leaves broad flat flaccid, panicle contracted, branches fascicled suberect, spikelets glabrous or setose, gl. I = $\frac{2}{3}$ II ovate acuminate 3–5-nerved, II subaristately acuminate 5-nerved, III subacute 3–5-nerved, IV oblong-lanceolate scabrid. *Steud. Syn. Gram.* 116. A. holcoides, *Trin. in Bull. Sc. Acad. Petersb.* i. (1836) 71. Brandtia holcoides, *Kunth Revis. Gram.* ii. 129, t. 170; *Steud. l. c.*—Arundinella? *Wall. Cat.* n. 8671.

South Deccan, and the Concan, &c., *Wight,* &c. Tenasserim, *Wallich, Helfer.*—Distrib. Philippines.

Stem 6–18 in., stout or slender. *Leaves* 1–4 in., up to $\frac{1}{2}$ in. broad, narrowed to the base, and sheaths usually clothed with long soft hairs; ligule a ridge of hairs. *Panicle* 1–9 in., always contracted; branches $\frac{1}{4}$–1 in., capillary, suberect, sparingly divided; gl. I and II rarely without bristles; III male or neuter; column of awn exserted, twisted.

Var. *ciliata;* panicle more copiously setose, spikelets rather larger. Arundinella ciliata, *Nees in Wight Cat.* n. 1666. A. pilosa, *Hochst. in Hohen. Pl. Ind. Or.* n. 647 & 935; *Miq. in Verh. Nedel. Ind.* iii. iv. (1851) 30. Holcus ciliatus, *Roxb. Fl. Ind.* i. 318. Andropogon paniceus, *Heyne ex Wall. l. c. & in Herb. Rottl.* Perotis polystachya, *Herb. Heyne ex Wall. l. c.* The Deccan Peninsula, from the Concan southward. Moulmein, *Griffith.*—Arundinella, *Wall. Cat.* n. 8664.

8. **A. tenella,** *Nees ex Steud. Syn. Gram.* 115; annual, glabrous, leaves flaccid lanceolate, panicle very large effuse copiously branched, rachis and branches capillary spreading, spikelets $\frac{1}{14}$—$\frac{1}{12}$ in. solitary long-pedicelled glabrous or sparsely setose, gl. I = $\frac{2}{3}$ III 3-nerved, II ovate-lanceolate acuminate 5-nerved, III 5-nerved, IV oblong, awn twice as long as the spikelet. *Wight Cat.* n. 1668; *Dalz. & Gibs. Bomb. Fl.* 292; *Duthie Grass. N.W. Ind.* 13; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 345. A. pumila, *Steud. l. c.* 114; *Lisboa l. c.* Acratherum pumilum, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 414, t. 100. Anemagrostis tenella, *Wight ex Steud. l. c.*

Western Himalaya; Garwhal, alt. 4000 ft. Rajpootana, on Mt. Abu, &c. Behar and Central India, alt. 3–4000 ft. The Khasia Hills, the Concan and Pegu.—Distrib. Abyssinia.

Stem 6–20 in., erect, soft, leafy, very sparsely hairy. *Leaves* from ovate and 2–4 in. long, to linear-lanceolate and 14 in. long, often $\frac{2}{3}$ in. broad, acuminate, membranous, many-nerved, base narrow; sheath rarely hairy; ligule short, hairy. *Panicle* 2–10 in.; rachis slender, strict, erect; branches alternate or the lower

subverticillately fascicled, each with widely spreading capillary branches and branchlets. *Spikelets* the smallest of the genus, usually shorter than their capillary pedicels; gl. IV scabrid above; column of awn slightly twisted.

9. **A. pygmea,** *Hook. f.*; annual, very small, slender, leaves chiefly radical narrow hispidly hairy nerveless except the midrib margins serrulate, panicle erect effuse, branches few capillary, spikelets few $\frac{1}{12}$ in. setose, gl. I = $\frac{2}{3}$ II ovate acute 3-nerved, II ovate-lanceolate long-acuminate 5-nerved, III obtuse obscurely 5-nerved, IV oblong truncate, awn twice as long as the spikelet.

North Canara, *Lisboa.*

Whole plant 6 inches high and very slender.—Closely allied to *A. tenella*, but very much smaller, with very slender stem, narrow chiefly radical leaves 1–1½ in. by $\frac{1}{10}$ in., sparsely clothed with long bristles, and a very sparingly divided panicle with few larger spikelets on very long capillary pedicels.—The specimens are very poor, and the character given may hence require modification.

10. **A. Metzii,** *Hochst. ex Miq. in Verh. Ned. Inst.* III lv. (1851) 31; tall, glabrous, leaves linear, panicle 3–10 in. effuse erect or inclined branches alternate or fascicled elongate, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. subsecund, long or short pedicelled glabrous or sparsely setulose, gl. I = $\frac{3}{4}$ II ovate acuminate 3-nerved, II ovate-lanceolate acuminate 5-nerved, III acute 5–7-nerved, IV oblong truncate obtuse or retuse scaberulous, awn about twice as long as the spikelet. *Steud. Syn. Gram.* 116 (*excl. Syn. Roxb.*); *Hochst. in Herb. Hohenack.* n. 257. A. agrostoides, *Trin.* var. *tenella*, *Herb. Ind. Or. Hf. & T.* Agrostis fusca, *Heyne ex Wall. Cat. & in Herb. Rottler.*—Arundinella, *Wall. Cat.* n. 8668.

Nilghiri Hills; the Wynaad, *Heyne.* The Concan and Canara, *Law*, *Metz*, *Thomson*, *Woodrow*, &c.

Annual? 1–3 ft. high. *Leaves* 4–6 by ¼–⅓ in., scaberulous and sheath more or less hairy or glabrous. *Panicle* 1–8 in.; rachis slender, smooth or subscaberulous; branches 1–4 in., uniformly flowering. *Spikelets* green or purplish, solitary or 2-nate, longer or shorter than their pedicels which are sometimes ¼ in. long; gl. I nerves sometimes scabrid; IV very obscurely bearded at the base, awn straight.—Hohenacker's specimens appear to be annual, Heyne's have a small hard rootstock. This is certainly not Roxburgh's *Holcus nervosus*, which Steudel cites for it. The panicle varies greatly in length, breadth and composition; in small specimens it is short and triangular with spreading nearly simple branches, in taller it is more effuse with long flexuous branches and much longer pedicels.

†† *Spikelets more than* $\frac{1}{10}$ *in. long.*

11. **A. villosa,** *Arn. ex Steud. Syn. Gram.* 115; stems tufted villous below the very narrow panicle, rachis villous, branches spiciform short simple hirsute, spikelets $\frac{1}{5}$–¼ in. secund crowded setosely hirsute, gl. I = ¾ II ovate acuminate 3–5-nerved, II subaristately acuminate 5-nerved, III acute 5-nerved neuter or male, IV oblong-lanceolate very minutely scaberulous, awn not twice as long as the spikelet. *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 106.

Eastern Himalaya, the Khasia Hills, Central India, the Deccan Peninsula & Ceylon.

Stem 12–16 in., slender, stiff, leafy at the villous base. *Leaves* 4–8 by $\frac{1}{12}$–$\frac{1}{10}$ in., strict, rather rigid, glabrous tomentose or villous; ligule of long hairs. *Panicle* 2–4 in., spiciform; branches ½–¾ in., brown. *Spikelets* subdistichously crowded, spreading or erect; column of awn included twisted.—Nees, according to Steudel, describes gl. IV. as 2-toothed. I find it to be usually rounded at the tip, but 2-toothed in

var. *himalaica*. Gl. III is more acute than is usual in the genus and its palea larger.

Var. *Wightii*; leaves very narrow convolute, basal sheaths woolly.

Var. *Heyne*; taller, stouter, basal sheaths nearly naked, leaves longer broader and flat 12 by $\frac{1}{3}$ in., panicle 4 in. long. Andropogon paniceus, *Herb. Heyne ex Wall. Cat.* n. 8663 A.—Courtallam, *Wight*.

Var. *himalaica*; basal sheaths naked, leaves 2–6 by $\frac{1}{4}$–$\frac{1}{3}$ in. flat, spikes sometimes shortly peduncled, gl. IV 2-toothed. A. Hookerii, *Munro ms.*—Bhotan, E. Nepal and Sikkim Himalaya, alt. 6–11,000 ft., *Griffith, J. D. H., Clarke*.

12. **A. birmanica,** *Hook. f.*; annual, stout, stem glabrous, leaves linear-lanceolate flat hirsute, panicle linear-oblong interrupted, branches sessile simple or sparingly divided, rachis ciliate and scaberulous, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. densely crowded subsessile glabrous or with a few setae, gl. I $= \frac{2}{3}$ II ovate subaristately acuminate 5-nerved, II ovate-lanceolate long-acuminate 5-nerved, III acute 5-nerved, IV oblong-lanceolate scabrid, awn not twice the length of the spikelet.

BURMA; Rangoon, *M'Lelland, Scott, Kurz*.

Stem tufted, 1–2 ft., stout, soft, leafy, nearly as thick as a goose-quill, nodes bearded. *Leaves* 4–8 by $\frac{1}{2}$–$\frac{2}{3}$ in., base subcordate, sheath hirsute; ligule a narrow ciliate membrane. *Panicle* 3–7 in., very pale, branches or spikes 1–2 in sessile, erect; gl. III male female or neuter, awn of IV with twisted included column.—Near *A. villosa*, but annual, with soft stems and leaves much smaller and hardly setose spikelets, stem glabrous below the panicle.

13. **A. brasiliensis,** *Raddi, Agrost. Bras.* 37, t. i. fig. 3; stem erect stout or slender, leaves broad or narrow, panicle pyramidal subcorymbose or thyrsiform sparingly or copiously branched, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. subsecund longer than their pedicels usually quite glabrous, gl. I $= \frac{2}{3}$ II ovate-lanceolate acuminate 3-nerved, II lanceolate finely acuminate 5-nerved, III subacute 5-nerved, IV oblong-lanceolate acute scaberulous, awn twice as long as the spikelet. *Trin. Diss.* ii. 62, *Panic. Gen.* 246, *Sp. Gram. Ic.* t. 266; *Doell in Mart. Fl. Bras.* ii. II, 298, t. 38. A. Ecklonii, *Nees Fl. Afr. Austr.* 80. A. martinicensis, *Trin. Diss.* ii. 62; *Panic. Gen.* 246; *Griseb. Fl. Brit. W. Ind.* 556. A. Mikani, *Nees Agrost. Bras.* 465. A. nepalensis, *Trin. Diss.* ii. 62; *Panic. Gen.* 335, *Sp. Gram. Ic.* t. 268; *Duthie Grass. N.W. Ind.* 13; *Steud. Syn. Gram.* 115; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891), 343. A. pallida, *Nees Agrost. Bras.* 465. A. rigida, *Nees Fl. Afr. Austr.* 80. A. Ritchiei, *Munro ex Lisboa l. c.* A. stricta, *Nees in Hook. Kew Journ.* ii. (1850), 102; ? *Dalz. & Gibs. Bomb. Fl.* 293. Acratherum miliaceum, *Link Hort. Berol.* i. 320. Orthopogon agrostoides, *Trev. ex Steud. Nom. Ed.* II. ii. 234. Aira brasiliensis, *Spreng. Syst. Veg.* i. 278. Goldbachia Mikani, *Trin. in Spreng. Neue Entdeck.* ii. 81. Ischæmum hispidum, *H. B. & K. Nov. Gen. & Sp.* i. 194; *Kunth Revis. Gram.* i. 373, t. 100; *Enum. Pl.* i. 515. Riedeliea Mikani, *Trin. ex Kunth Enum. l. c.* Holcus nervosus, *Roxb. Fl. Ind.* i. 318. Thysanachne scoparia, *Presl Nov. Pl. Gen. Diss.* 1829, *cum Ic. Rel. Hænk.* i. 253. Andropogon hispidus, *Willd. Sp. Pl.* iv. 908. A. ? epiphyllus, *Wall. Cat.* n. 8667 A. A. virens, *Spreng. Syst.* i. 287.—Airacea, *Griff. Notul.* 53, *Ic. Pl. Asiat.* t. 141, f. 11.—Arundinella, *Wall. Cat.* n. 8666, 8667.

Throughout the hilly parts of INDIA, from the Himalaya, ascending to 7000 ft., to BURMA and CEYLON.—DISTRIB. China, Malaga, Australia, S. Africa, trop. America.

Perennial; rootstock stout, hard, creeping and sending out stout sheathed branches sometimes as thick as a goose-quill, or tufted and intricately branched.

Stems 1–5 ft., from the thickness of a sparrow's to a goose quill, simple or branched, nodes glabrous or pubescent. *Leaves* 6–12 by $\frac{1}{6}$–$\frac{2}{3}$ in., usually ciliate at the narrow base; ligule of soft hairs. *Panicle* 4–18 in.; branches 1–10 in., few or many, fascicled or subverticillate, densely or laxly imbricating, usually slender and undivided. *Spikelets* distant or crowded, green or purplish; gl. I sometimes very sparingly setose; III male or neuter, rarely imperfectly bisexual; IV always bearded at the base, column of awn more or less twisted.—An abundant grass in many parts of India, but so variable that it is difficult to formulate a character for it that will not include other species. Dr. Stapf has aided me in the examination of a mass of Indian specimens, including many hundreds collected by Clarke over the length and breadth of India; and especially in the more important matter of identifying *A. nepalensis* with the American *A. brasiliensis*, and various others here brought together as synonyms. The largest form is Wallich's 8636 A, with a stout creeping woody rhizome, sheathed surculi as thick as a goose-quill, a stout stem 5 ft. high, broad often hirsute leaves, and a large panicle 6–12 in. long of spikelets $\frac{1}{6}$ in. long; it is a tropical and subtropical plant extending in the Himalaya from Kumaon eastward, and is common in the Khasia Hills. Wallich's 8666 B (from the Calcutta Bot. Gardens?) is a tall much more slender plant, with matted roots, very narrow leaves with tubercle-based hairs, and a slender thin panicle. His 8667 A. B. from Burma, is a tall plant with soft hairy leaves $\frac{1}{4}$–$\frac{1}{2}$ in. broad, and an effuse subpyramidal panicle with fascicled capillary branches and smaller spikelets about $\frac{1}{8}$ in. long. It is common throughout the lower Himalaya and Khasia Hills. Another variety, with a straggling branching rootstock, proliferously fascicled branches sheathed at the base, short or long glabrous or hairy linear-lanceolate leaves, and small oblong panicles with few slender branches and few spikelets, occurs at elevations of 4–6000 ft. Lastly, there is a common Himalayan slender form from the Panjab eastwards, six inches to a foot high, with tufted roots, very narrow leaves, a small oblong panicle, and small spikelets. *A. Ritchiei*, Munro, is a tall stout Concan form, $2\frac{1}{2}$ ft. high, with a shortly creeping rootstock, narrow obscurely hairy convolute leaves, a very narrow panicle, and pale small spikelets.

14. **A. fuscata,** *Nees ex Buese in Miq. Pl. Jungh.* 359; perennial, stout, rather short, leaves short flat hirsute, panicle oblong dense-fld. usually purplish, rachis stout pubescent or villous, branches crowded erect, spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. secund crowded sessile or shortly pedicelled glabrous or sparsely setose, gl. I = $\frac{3}{4}$ II broadly ovate acuminate 3–5-nerved, II ovate-lanceolate acuminate 5-nerved, III obtuse or truncate 5-nerved, IV oblong-lanceolate emarginate scabrid, awn short. *Steud. Syn. Gram.* 114; *Wight Cat.* n. 1667; A. purpurea, *Hochst. ex Steud. l. c.* 115; ?*Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 345. Acratherum fuscatum, *Nees ex Steud. l. c.*

The CONCAN (*Lisboa*). NILGHIRI HILLS, *Heyne*; Ootacamund, alt. 6000 ft., *Wight, Lawson, King.* PEGU, at Rangoon, *Kurz.*

Stem 1–2 ft., stiff, glabrous or pubescent below the panicle. *Leaves* 1–8 by $\frac{1}{4}$–$\frac{1}{3}$ in., lanceolate, tapering from the base to the tip, coriaceous, strongly nerved; sheath hirsute; ligule very short, ciliate. *Panicle* 2–5 in., erect; rachis and subsimple branches stiff, angular, scaberulous. *Spikelets* stouter and glume much broader than in any form of *brasiliensis*.—Heyne's specimens are more slender than Lawson's. I have seen no specimens from the Concan. The Rangoon plant has a very pale panicle.

15. **A. capillaris,** *Hook. f.*; perennial, very slender, leaves narrow glabrous or hairy, panicle oblong branches alternate slender flexuous naked below, spikelets $\frac{1}{6}$ in. distant solitary glabrous shorter than their pedicels, gl. I = $\frac{2}{3}$ II ovate-lanceolate acuminate 3–5-nerved, II lanceolate acuminate 5-nerved, III not exceeding I obtuse 5-nerved, IV lanceolate acute scabrid, awn about twice as long as the spikelet. A mutica, *Nees ex Steud. Syn. Gram.* 116; ? *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891)

8. Andropogon capillaris, *Herb. Heyne.*—Arundinella sp., *Wall. Cat.* n. 8665 A.

The DECCAN, *Heyne.* PULNEY HILLS, *Herb. Wight* (n. 3338).

Stem erect from a tuberous rhizome which is clothed with the woolly bases of leaf-sheaths. *Leaves* 6–12 by $\frac{1}{6}$–$\frac{1}{3}$ in., acuminate, base rather narrow; upper sheaths glabrous; ligule a ridge of hairs. *Panicle* 5–7 in., flexuous; rachis filiform, scaberulous; branches few, 4–6 in., naked below except a solitary long-pedicelled axillary spikelet; pedicels capillary.—An obscure plant. Nees describes the leaves as with sparsely setulose margins, and gl. IV as mucronate, from which it is evident that the awn has fallen away in his specimen. This latter suggested the name *mutica*, which, being misleading, I have replaced by Heyne's of *capillaris*. Wight's Pulney specimens have a slightly hairy panicle 3 in. long, with more numerous close-set branches and closer spikelets. Lisboa (Journ. Bomb. Nat. Hist. Soc. v. (1890) 344) gives *mutica* as a common plant all over Bombay, but without seeing specimens I cannot confirm this.

16. **A. laxiflora,** *Hook. f.*; very slender, glabrous, leaves narrow, panicle effuse, branches spreading capillary solitary alternate or opposite or the lower fascicled, branchlets spreading, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. solitary shorter than their capillary pedicels, gl. I = $\frac{2}{3}$ II ovate acuminate 3-nerved, II ovate-lanceolate 5-nerved, III longer than I oblong acute, IV longer than III oblong-lanceolate scaberulous, awn 0 or shortly exserted. A. nervosa, *Thw. Enum. Pl. Zeyl.* 362 (*excl. Syn.*); *Trim. Cat. Ceyl. Pl.* 106.

CEYLON, *Gardner*; Central Province, alt. 3–5000 ft., *Thwaites* (C.P. 919).

Annual? glabrous. *Stem* 12–30 in., tufted, geniculately ascending, nodes glabrous. *Leaves* 4–8 by $\frac{1}{8}$–$\frac{1}{3}$ in., finely acuminate; ligule narrow, membranous, ciliate. *Panicle* 4–6 in., green. *Gl.* I scabrid on the keel or not; IV bearded at the base or not; column of awn twisted.—The open panicle with long capillary pedicels of the spikelet and quite acute gl. III which is $\frac{1}{4}$ longer than I, characterize this species. One specimen (*Gardner*, n. 1007) has no trace of an awn.

*** Awn 0, or very short and hardly exserted (see also *A. laxiflora*).

17. **A. Wallichii,** *Nees ex Steud. Syn. Gram.* 114; perennial, stout, erect, panicle elongate contracted strict, branches 1–1$\frac{1}{2}$ in. stout stiff spiciform, spikelets 3–4-seriate ovoid secund densely imbricate very stoutly pedicelled setose, gl. I nearly = II ovate acute 3–5-nerved, III oblong obtuse 5-nerved, IV ovoid subacute nearly smooth, awn 0 or very short. *Duthie Grass. N.W. Ind.* 13. Panicum strictum, *Roxb. Fl. Ind.* i. 303. P. bengalense, *Spreng. Syst.* i. 311; *Steud. Syn. Gram.* 48. P. pyramidale, *β* ? *Herb. Ham. ex Wall. Cat.* n. 8700.—Panicum, *Wall. Cat.* n. 8700.—Arundinella ? *Wall. Cat.* n. 8669.

TROPICAL HIMALAYA; on dry banks from Simla to Sikkim, alt. 1–6000 ft. BENGAL, BEHAR, the KHASIA, NAGA and SATPURA HILLS. BURMA; Shan Hills, *Manders.*—DISTRIB. Tonkin.

Stem 1–3 ft., from a woody creeping or tufted hard rhizome; nodes bearded or not. *Leaves* 12–18 by $\frac{1}{3}$–$\frac{2}{3}$ in., all radical in small forms, glabrous hairy or villous, lanceolate, acuminate; sheath smooth scabrid or villous; ligule a ridge of hairs. *Panicle* 6–12 in. (the stoutest of the Indian species); branches $\frac{1}{2}$–1 in., lower sometimes whorled, erecto-patent, flowering to the base; rachis angular, scabrid. *Spikelets* green or purplish; gl. IV naked at the base; awn not twisted.

18. **A. Clarkei,** *Hook. f.*; tall, very stout, leaves very long, panicle very large subcorymbiform, branches 3–8 in. fascicled erect very slender simple upper much longer than the rachis, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. 1–2-seriate secund shortly pedicelled, gl. I = $\frac{3}{4}$ II ovate acute 5-nerved, II ovate-

lanceolate acute 5-nerved, III oblong obtuse, IV ovate-lanceolate, awn very shortly exserted base twisted.

Sikkim Terai, *Clarke.*

Stem 6 ft. or more, stouter than a swan's quill above. *Leaves* 2–3 ft. by 1 in., coriaceous, hairy beneath; sheath long, margins fimbriate; ligule a ridge of hairs. *Panicle* 12–18 by 4–6 in.; rachis stout, erect, angular, nearly smooth; branches rarely divided, filiform, scaberulous. *Spikelets* solitary or 2-nate, pale, usually longer than their pedicels.—The great size, large panicle with long branches, the upper far exceeding the rachis, will characterize this gigantic species.

19. **A. leptochloa,** *Hook. f.*; tall, slender, leaves narrow, panicle pyramidal or subcorymbiform often interrupted, branches short simple slender alternate whorled or fascicled, spikelets $\frac{1}{10}$ in. 1–2-seriate secund sessile or pedicelled glabrous, gl. I = $\frac{3}{4}$ II ovate acuminate 3-nerved, II ovate-lanceolate acuminate 5-nerved, III ovate-oblong subacute 5-nerved, IV lanceolate scaberulous base naked, awn minute or 0. Panicum leptochloa, *Nees ex Steud. Syn. Gram.* 62; *Wight Cat.* n. 1621; *Steud. Syn. Gram.* 62; *Thw. Enum. Pl. Zeyl.* 360; *Trim. Cat. Ceyl. Pl.* 105. P. zeylanicum, *Arn. mss.* Leptochloa ? panicoides, *Herb. Wight,* n. 125, *ex Steud. l. c.* L. pectinata, *Steud. l. c.*

Malabar; at Quilon, *Wight.* Ceylon, not uncommon, *Thwaites.*

Stem 2–4 ft., from a woody rootstock, as thick as a crow-quill or less; nodes glabrous. *Leaves* 6–10 in., rarely $\frac{1}{4}$ in. broad, glabrous or hairy; sheath smooth or hairy; ligule obscure. *Panicle* 2–14 in., rachis faintly scaberulous; branches 1–4 in., suberect, rarely spreading, slender, not flexuous; axils bearded or ciliate. *Spikelets* rarely longer than their pedicels; gls. thin, nerves of I scabrid.

Var. *gracillima*; more slender, leaves narrower, panicle pyramidal, branches alternate very distant, spikelets more distant very shortly pedicelled.—Cochin, *Johnstone,* in wet places. Nilambar, *Lawson.*

20. **A. Lawsoni,** *Hook. f.*; tall, stout, leaves linear-lanceolate acute scabrid above, panicle tall pyramidal, rachis scabrid, branches fascicled or subverticillate erecto-patent filiform strict simple or lower branched, spikelets $\frac{1}{8}$ in. solitary or 2-nate glabrous about equalling their pedicels, gl. I = $\frac{2}{3}$ II ovate acuminate 3–5-nerved, II ovate-lanceolate acuminate 5-nerved, III obtuse 5–7-nerved, IV lanceolate scaberulous base naked, awn 0.

Nilghiri Hills; in swamps at Goodaloor, alt. 3000 ft., *Lawson.*

Stem erect, 3–4 ft. high, nearly as thick as the little finger below. *Leaves,* lower few, 8–12 by $\frac{2}{3}$ in., narrowed from the base to the acuminate tip, flat, rigid, upper very narrow; midrib slender; nerves very many and close, margins scabrid; sheath hairy; ligule 0. *Panicle* dull blue-purple; rachis strict and branches scaberulous; branches alternate or fascicled, lower 4–6 in. branching at the base. *Spikelets* glabrous, sessile or pedicelled, longer or shorter than their slender pedicels; gls. rather coriaceous, nerves strong.—A very distinct-looking plant, unlike any known to me, but I have seen only one specimen, and it may prove to be a form of *A. leptochloa.*

21. **A. gigantea,** *Dalz. in Dalz. & Gibs. Bomb. Fl.* 293; tall, stout, upper leaves 1–1$\frac{1}{4}$ in. broad lanceolate base rounded or subcordate, panicle subcorymbosely thyrsiform, rachis stout, branches 2–4 in. densely crowded slender simple erect angular, spikelets $\frac{1}{12}$ in. 2–3 seriate secund very shortly pedicelled, gl. I = $\frac{3}{4}$ II broadly ovate acute 3-nerved, II ovate acuminate

5-nerved, III rather longer than I, obtuse 5-nerved, IV lanceolate base naked, awn 0.

The CONCAN, *Stocks*; Kineshwur, at the foot of the Ghats, *Dalz. & Gibs.*

Stem 6 ft., branched below, as thick as a goose-quill at 18 in. below the panicle, nodes swollen. *Leaves* 12–24 in., finely acuminate, subcoriaceous, many-nerved, scabrid above, glabrous or sparingly hairy, margins smooth; sheath sparingly hairy; ligule a narrow glabrous membrane. *Panicle* 5–7 in. long by 2–3 broad, brush-like, branches uniform, quite concealing the angular scabrid rachis. *Spikelets* brownish, short and broad, keel of gl. I scabrid.—A distinct-looking plant, nearest perhaps to *A. Clarkei* in inflorescence.

22. **A. blephariphylla,** *Trim. mss.*; tall, stout, leafy, leaves long broad thin smooth, margins setosely serrulate, panicle broadly oblong, branches laxly whorled spreading filiform, spikelets $\frac{1}{8}$ in. subsolitary as long as their pedicels glabrous, gl. I = $\frac{3}{4}$ II broadly ovate acute 3-nerved, II ovate acuminate 5-nerved, IV oblong subacute 5-nerved, IV lanceolate scaberulous base naked, awn 0.—Panicum blephariphyllum, *Trim. in Lond. Journ. Bot.* xxii. (1885) 272, *Cat. Ceyl. Pl.* 105.

CEYLON; margins of woods by the sea at Resanwelle, *Ferguson, Trimen.*

Annual? *Stem* 3 ft. and upwards, nodes glabrous. *Leaves* 12–18 by nearly 1 in., rather membranous; sheath loose; ligule obscure. *Panicle* 4–6 in.; rachis strict, nearly smooth; branches spreading or subrecurved; axils hairy.—The specimens are few, but the species appears to be a distinct one, nearest to *A. leptochloa*, which has narrower more coriaceous leaves and smaller spikelets.

23. **A. Thwaitesii,** *Hook. f.*; very slender, glabrous, leaves very narrow, panicle oblong effuse, branches capillary solitary alternate or the lower fascicled, branchlets spreading, spikelets $\frac{1}{8}$ in. solitary shorter than their capillary pedicels, gl. I = $\frac{2}{3}$ III very broadly ovate acute 3–5-nerved, II broadly ovate acuminate 5-nerved, III as long as II acute 7-nerved, IV lanceolate acute, awn 0. A. nervosa, var. *Thwaites mss.*

CEYLON, *Walker*?; Ambagamowa district, *Thwaites* (C.P. 3782).

Stem 2–3 ft., strict, erect; nodes glabrous. *Leaves* 4–8 by $\frac{1}{8}$–$\frac{1}{4}$ in., finely acuminate; ligule a short ciliate membrane. *Panicle* 3–5 in., branches naked at the base. *Spikelets* more turgid and coriaceous than usual in the genus, with shorter, broader, shorter pointed, purplish glumes; IV naked at the base.—Nearly allied to *A. laxiflora*, but has much broader glumes, of which III is longer than I and about as long as II.

UNDETERMINABLE SPECIES.

A. INDICA, *Trin. mss. ex Steud. Nom. Ed.* II i. 143 = Agrostis biseta, *Herb. Spreng.*—Name only.

A. SPICATA, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 293; stem 1 ft., leaves 1–1½ by ¼ in. ensiform and sheaths hispid, spike 1½ in. cylindric (as in *Setaria*) dense-fld. gl. I $\frac{1}{12}$ in. lanceolate subulate subpilose 3-nerved, upper $\frac{1}{5}$ in. long-attenuated and folded concealing the awn.—THE CONCAN, on the Mahableshwur Hills, common.

A. JAPONICA, *Duthie Grass. N.W. India*, 13.

13. SETARIA, *Beauv.*

Spikelets 1- rarely 2-fld., not awned, clustered on the very short branches of a spike-like or narrowly pyramidal panicle, articulate on very short pedicels which bear a persistent involucel of few or many scabrid or barbed bristles (barren branchlets). *Glumes* 4, membranous; I = about

½ III; II = or shorter than IV; III neuter, rarely paleate and male, 5–7-nerved; IV coriaceous, plano-convex, bisexual, triandrous. *Styles* distinct. Grain free within the hardened gl. and palea.—Species about 10, temperate and tropical.

Distinguished from *Panicum* by the involucel, but connected with it by ***P. plicatum*** and ***S. Forbesiana***; and from *Pennisetum* by the persistent involucels and articulate deciduous spikelets. The species are for the most part difficult of limitation, and much of the synonymy requires revision.

1. **S. italica,** *Beauv. Agrost.* 51; leaves broad, panicle dense inclined or nodding simple and cylindric or lobed or compound, bristles few smooth or with minute spreading barbs, gl. 1 oblong or subglobose nearly smooth. *Kunth Revis. Gram.* 146, *Enum. Pl.* i. 153, *Suppl.* 108; *Reichb. Ic. Fl. Germ.* t. 47; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 22; *Wall. Cat.* n. 8643; *Trim. Cat. Ceyl. Pl.* 107; *Aitchis. Cat. Panjab. Pl.* 162; *Duthie Grass. N.W. Ind.* 8, *Field & Gard. Crops*, 5, t. 25, *Fodd. Grass. N. Ind.* 15; *Miq. Fl. Ind. Bat.* iii. 467; *Griseb. Fl. Brit. W. Ind.* 554. S. asiatica, *Hort. ex Reichb. Fl. Germ. Excurs.* 29. S. compacta, *Schur. Enum. Pl. Transylv.* 967, *Index* S. erythrosperma, flavida, persica & violacea, *Hornem. ex Reichb. l. c.* S. germanica, *Beauv. Agrost.* 51, t. 13. S. globularis, *Presl. Rel. Haenk.* 407; *Miq. l. c.* S. macrochæta, *Sch. Mant.* ii. 274. S. maritima, *R. & S. Syst.* ii. 492. S. melinis, *Link. ex Steud. Nom. Ed.* II. ii. 574. S. panis, *Jessen Deutschl. Graes.* 248. Panicum ægyptiacum & sibiricum, *Hort. ex Roem. & Sch. Syst.* ii. 493. P. asiaticum, mel-frugum, & serotinum, *Hort. ex Schult. Mant.* ii. 598, 599. P. attenuatum, setaceum & setosum, *Hort. ex Trin. Gram. Panic.* 166. P. brevisetum, *Doell Fl. Grossh. Bad.* 233. P. compactum, *Kit. in Schult. Œster. Fl. Ed.* II. i. 212. P. elongatum, *Salisb. Prodr.* 18. P. germanicum & indicum, *Mill. Gard. Dict. Ed.* 8, n. 1 & 3. P. globulare, *Steud. Nom. l. c.* 51; *Syn. Gram. l. c.* P. glomeratum, *Moench. Meth.* 207. P. intermedium & erythrospermum, *Vahl ex Hornem. Hort. Hafn.* i. 82. P. italicum, *Linn. Sp. Pl.* 56, *Host l. c.* t. 314; *Trin. Sp. Gram. Ic.* t. 188, 189; *Roxb. Fl. Ind.* i. 302; *Steud. Syn. Gram.* 51; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98; *Wight Cat.* n. 1645. P. miliaceum, *Blanco Fl. Filip. Ed.* I. 39. P. maritimum, *Hort. ex Lamk. Encycl.* iv. 737. P. pumilum, *Link Enum. Hort. Berol.* 76. P. vulgare, *Wallr.* in *Linnæa*, xiv. (1840) 542. Pennisetum macrochaetum, *Jacq. Eclog. Gram.* iii. 36, t. 25; *Kunth Enum.* i. 152.—Setaria, *Wall. Cat.* n. 8651.—*Rheede Hort. Mal.* xii. t. 79.

Hab. Cult. throughout India, and up to 6000 ft. in the Himalaya.—Distrib. Most warm, temperate and tropical countries.

Stem 2–5 ft., usually branched, tufted, rooting towards the base, often robust. Annual. *Leaves* often long broad, margins retrorsely hispid, sheath smooth, mouth bearded. *Spiciform* panicle 3–5 in. long, very variable in diameter, number and length of bristles of involucel, and size and form of gl. IV.—Possibly a cultivated form of *S. viridis*, but nothing is known of its origin, which reaches back to the period of the Swiss Lake-dwellings. It has from time immemorial been cultivated in Asia, and one form is regarded by the natives as indigenous in Japan and China (see Du Candolle l'Origine des Plantes Cultivées, p. 303). Duthie and Stewart regard some small forms as indigenous in India, but they are more probably escapes or their progeny.

2. **S. glauca,** *Beauv. Agrost.* 51; panicle spiciform cylindric, involucels of 6–12 bristles with spreading or erect barbs, gl. IV transversely rugose. *Kunth Enum. Pl.* i. 149, *Suppl.* 106; *Wall. Cat.* n. 8639; *Griff. Notul.* 44, *Ic. Pl. Asiat.* t. 149, f. 1; *Dalz. & Gibs. Bomb. Fl.* 293; *Aitchis.*

Cat. Panjab. Pl. 162; *Trim. Cat. Ceyl. Pl.* 105; *Miq. Fl. Ind. Bat.* iii. 466; *Duthie Grass. N.W. Ind.* 8, *Indig. Fodd. Grass.* t. x., *Fodd. Grass. N. Ind.* 14; *Griseb. Fl. Brit. W. Ind.* 554; *Benth. Fl. Austral.* vii 492; *Reichb. Ic. Fl. Germ.* t. 47; *Boiss. Fl. Orient.* v. 442; *Baker Fl. Maurit.* 442. S. aurea, *Hochst. ex A. Br. in Flora*, xxiv. (1841) 276. S. auricoma, *Link. ex Loud. Hort. Britt.* 25. S. chrysantha, *Heynh. Nom.* ii. 661. S. flava, *Kunth Rev. Gram.* i. 46. S. helvola, *Roem. & Sch. l. c.*; *Miq. l. c.* 467. S. humifusa & rubicunda, *Dum. Obs. Gram. Belg.* 139. S. pumila, *Sch. Mant.* ii. 274. ? S. sciuroidea, *C. Muell. in Bot. Zeit.* xix. (1861) 316. S. tejucensis, *Kunth Enum. Pl.* i. 150. S. Ventenatii, *Kunth Rev. Gram.* i. 251, t. 37. S. dasyura, *Hort. Hal. ex Schlecht in Linnæa*, xxvi. (1853) 463. S. penicillata, *Nees in Wall. Cat.* n. 8640 A. B. C. E. Panicum alopecuroides, *Koen. ex Trin. Gram. Panic.* 162. P. chrysanthum, *Steud. Nom. Ed.* 2, ii. 254. P. flavescens, *Moench. Meth.* 206. P. glaucum, *Linn. Sp. Pl.* 56; *Host Gram. Austr.* ii. t. 16; *Trin. Sp. Gram. Ic.* t. 195; *Roxb. Fl. Ind.* i. 285; *Thw. Enum.* 361; *Wight Cat.* n. 1643; *Benth. Fl. Hongk.* 411; *Nees Fl. Afr. Austr.* 55, *Agrost. Bras.* 241. P. helvolum, *Linn. f. Suppl.* 107. P. holcoides, *Jacq. Eclog. Gram.* t. 22. P. lævigatum, *Ell. Sketch.* i. 112. P. lutescens, *Weig. Obs.* 20. P. luteum, *Guldenst. Reis.* ii. 58. P. minimum, *Wall. Cat.* 8641 B. P. penicillatum, *Willd. ex Nees Agrost. Bras.* 242; *Willd. β* (or *P. helvolum*, Linn.) *Wight Cat.* n. 1644. P. polystachyum, *Herb. Heyne ex Wall. Cat.* 8639 E. P. pumilum, *Poir. Encycl.* iv. 273 (*ex Kunth l. c.*). P. Ventenatii, *Steud. Nom. Ed.* II, ii. 265. P. verticillatum, *Rottl. ex Spreng. Syst.* i. 304. P. viride, *Poll. Hist. Pl. Palat.* i. 55. Pennisetum glaucum & helvolum, *Br. Prodr.* 195.

Throughout INDIA, especially in cult. ground.—DISTRIB. All warm, temp. and trop. regions.

Annual. *Stem* 1–2 ft. erect or ascending, simple or branched. *Leaves* broad or narrow, sometimes 18 by $\frac{1}{3}$ in., flat, glabrous or sparsely hairy, margins scabrid. *Spiciform panicles* cylindric, 1–7 in., dense-fld., usually yellow, rarely purplish or green, rarely interrupted; sometimes reduced to an ovoid head with very few spikelets; bristles of involucel 6-12, very variable in length, from a little longer to four times as long as the ovoid spikelet; gl. I minute; II rather shorter than III, subacute; III usually empty, sometimes paleate and male; IV broadly ovoid, very convex.

Var. *macrocarpa*; gl. III and IV equal and subsimilar in the ripe state, forming a subglobose crustaceous rugose sphere $\frac{1}{8}$ in. diam., III paleate empty, IV fem., bristles of involucel $\frac{1}{2}$ in. pale rufous.—The Panjab, *Aitchison*, Western Bengal and Behar, *Kurz.*—A remarkable form, but passing into the ordinary state of the plant by intermediates.

Var. *parviflora*, Munro mss.; stems 6–10 in. branched and decumbent below, leaves smaller, spiciform panicle $\frac{1}{2}$–1 in., ovoid nearly white, bristles of involucel $\frac{1}{6}$–$\frac{1}{4}$ in., gl. IV much less strongly rugose.—? S. imberbis, *Roem. & Sch.* ii. 891; *Wall. Cat.* n. 8641 A *in part*, B–F. Panicum Codaea, *Herb. Ham. in Wall. Cat. l. c.*—Kumaon, alt. 4–5000 ft., *Duthie.* Khasia Hills, alt. 5000 ft., *Clarke.* The Concan, Madras and Burma, *Wallich.*—Probably the *S. imberbis*, of Africa, &c., but a smaller plant, with very small spikes, differing in this respect and in the less rugose gl. IV from *S. glauca*.

3. **S. intermedia,** *Roem. & Sch. Syst.* ii. 489; panicle narrowly pyramidal subspiciform or very slender with segregate clusters of involucels, bristles of involucel with spreading or suberect barbs, gl. IV small oblong subrugulose. *Kunth Enum. Pl.* i. 150; *Aitch. Cat. Panjab. Pl.* 162; *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 9, *Fodd. Grass. N. Ind.* 14; *Miq. Fl. Ind. Bat.* iii. 466. S. verticillata, *Wall. Cat.* n. 8642 (D. *in*

part) G. S. glauca, *Hochst. Pl. Hohenack.* n. 937. Panicum intermedium, *Roth Nov. Sp.* 47; *Thw. Enum.* 361.

Plains and lower hills of INDIA, but not common. HIMALAYA, the PANJAB, to BENGAL, CENTRAL INDIA, and the NILGHIRI HILLS. CEYLON, in shady places, *Thwaites.*—DISTRIB. Temp. and trop. regions.

Undistinguishable from *S. verticillata* except by the barbs of the bristles of the involucel not being reversed. It is probably a common but overlooked grass.

4. **S. verticillata,** *Beauv. Agrost.* 51; panicle subpyramidal or subspiciform, lower involucels in segregate clusters, bristles with reversed barbs, gl. IV minutely rugulose. *Kunth Enum. Pl.* i. 152; *Wall. Cat.* n. 8642 A. B. C. D *in part*, E. F.; *Dalz. & Gibs. Bomb. Fl.* 294; *Aitch. Cat. Panjab Pl.* 162; *Trim. Cat. Ceyl. Pl.* 105; *Duthie Grass. N.W. Ind.* 9, *Fodd. Grass. N. Ind.* 15; *Benth. Fl. Austral.* vii. 494; *Host Gram. Austr.* t. 13; *Reichb. Ic. Fl. Germ.* t. 47; *T. Nees Gen. Fl. Germ. Monoc.* n. 22. S. floribunda, *Spreng. Syst.* i. 305; *Wall. Cat.* n. 8642 E. S. nubica, *Link. Hort. Berol.* i. 220. S. respiciens, *Hochst. ex Miq. Fl. Ind. Bat.* iii. 467. S. verticilliformis, *Dum. Fl. Belg.* 150. S. Rottleri, *Spreng. Syst. Veg.* i. 304; *Steud. Syn. Gram.* 153. ? S. tomentosa, *Kunth Revis. Gram.* i. 47; *Enum. Pl.* i. 157. Panicum Aparine, *Steud.* 52. P. adhaerens, *Forsk. Fl. Ægypt. Arab.* 20. P. asperum, *Lamk. Fl. Fr.* iii. 577. P. floribundum, *Willd. ex Spreng. Syst.* i. 306. P. humile, *Trin. Gram. Panic.* 167. P. italicum, *Ucria, Hort. Reg. Panorm.* 54. P. respiciens, *Hochst. ex Steud. l. c.* 52. P. rude, *Lamk. ex Steud. Nom. Ed.* 1, 589, 772. ? P. tomentosum, *Roxb. Fl. Ind.* i. 301. P. verticillatum, *Linn. Sp. Pl. Ed.* II, 82; *Roxb. Fl. Ind.* i. 301; *Thw. Enum.* 361; *Trin. Sp. Gram. Ic.* t. 202. P. viride, *Desf. Fl. Atlant.* i. 58. Pennisetum verticillatum, *Br. Prodr.* 195. Penn. respiciens, *A. Rich. Tent. Fl. Abyss.* ii. 379.

Throughout INDIA, in shady places, ascending the Himalaya to 6000 ft. CEYLON, not very common.—DISTRIB. Temp. and trop. regions.

Annual. Habit of *S. glauca* but usually more flaccid. *Leaves* sometimes 1 in. broad, scaberulous. *Panicle* 2–7 in. long, erect or curved, green; bristles of involucel one or few, about $\frac{1}{6}$ in. long, flexuous. *Spikelets* $\frac{1}{14}$–12 in.; gl. I about = $\frac{1}{2}$ III; II about = IV which is nearly smooth and shining.

5. **S. viridis**, *Beauv. Agrost.* 51; panicle spiciform cylindric often interrupted, bristles of involucel 3–6 with erect or spreading barbs, gl. IV oblong minutely punctulate or subrugulose. *Kunth Enum.* i. 151; *Aitch. Cat. Panjab. Pl.* 162; *Miq. Fl. Ind. Bat.* iii. 467; *Host Gram. Austr.* ii. t. 14; *Fl. Dan.* t. 352; *Reichb. Ic. Fl. Germ.* t. 47; *Boiss. Fl. Orient.* v. 443; *Benth. Fl. Austral.* vii. 494; *Griseb. Fl. Brit. W. Ind.* 554; *Duthie Grass. N.W. Ind.* 9. S. affinis, *Schult. Mant.* ii. 275. S. ambigua, *Guss. Fl. Sic. Syn.* i. 114. S. chlorantha, *Schur Enum. Pl Transs.* 723. S. decipiens, *C. Schimp. ex Nym. Consp.* 787. S. imberbis & Weinmanni, *Roem. & Schult. Syst.* ii. 891, 490. S. nana, *Dum. Obs. Gram. Belg.* 139. S. penicillata, *Wall. Cat.* n. 8640 D. S. villosa, *Beauv. Agrost* 51. Panicum bicolor, *Moench. Meth.* 206. P. cynosuroides, *Scop. Fl. Carn. Ed.* II. i. 50. P. humile, *Thunb. ex Trin. Gram. Panic.* 164. P. imberbe, *Poir. Encycl. Suppl.* iv. 272. P. lævigatum, *Lam. Fl. Fr.* iii. 578. P. psilocaulum, *Steud. Syn. Gram.* 50. P. purpurascens, *Opiz. in Flora*, v. 266; *Raddi ex Nees Agrost. Bras.* 240. P. quale Linnæi, *Krock Fl. Siles.* i. 88. P. reclinatum, *Vill. Hist. Pl. Dauph.* ii. 64. P. tejucense, *Nees ex Trin. Gram. Panic.* 166. P. virescens, *Salzm. ex Doell in Mart. Fl. Bras.* ii. II, 157. P. viride, *Linn.*

Syst. Ed. x. 870; *Trin. Sp. Gram. Ic.* t. 203. Pennisetum viride, *Br. Prodr.* 195.

TEMPERATE HIMALAYA and WESTERN TIBET, ascending to 11,000 ft., but not common; rare on the plains of India. NILGHIRI HILLS? (perhaps introduced) *Heyne* (*in Herb. Wallich.* n. 8640 D.).—DISTRIB. Temp. and subtrop. regions of the Old World.

Annual. Habit of *S. glauca*, but spike-like panicle more interrupted; bristles of involucel 3–6, usually short, green or reddish; spikelets larger and more ovoid, and gl. IV nearly smooth. *Gl.* I = about ½ III, acute; II and III subequal, 5–7-nerved.

6. **S. gracillima,** *Hook. f.*; leaves long narrow pubescent, peduncles elongate filiform scaberulous, spike-like panicle elongate rachis capillary villous or pubescent, spikelets minute solitary or in distant shortly pedicelled clusters of 2–3, bristles 1–2 capillary most minutely scaberulous, gl. IV transversely rugulose.

CEYLON, *Gardner* (n. 968).

Whole plant 18 in. high, flaccid, very slender; stems densely tufted. *Leaves* 8–12 by ⅛ in., finely acuminate, pubescent on both surfaces, base narrow; sheath narrow, mouth villous. *Peduncles* 3–4 in., quite erect, rachis hardly flexuous, pedicels pubescent, bristles erect, often solitary. *Spikelets* subglobose, glabrous, green; gl. I = ½ III, broadly ovate, 3-nerved; II shorter than IV, 5–7-nerved; III as long as IV, subacute, 5-nerved, palea large hyaline; IV pale, coriaceous, acute.—Quite unlike any other species.

7. **S. Forbesiana,** *Hook. f.*; perennial, tall, erect, leaves linear-lanceolate base rounded, panicle narrowly pyramidal, branches short or elongate, bristles few very rigid, spikelets ovoid, glumes strongly nerved, IV minutely transversely rugulose. Setaria macrostachya, *Duthie Grass. N.W. Ind.* 9; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 2; *Herb. Ind. Or. Hook. f. & Thoms.* (*vix H. B. & K.*). Panicum Forbesianum, *Nees ex Steud. Syn. Gram.* 98; *Anderss. in Walp. Ann.* vi. 948.—Panicum, *Wall. Cat.* n. 8704.

TEMPERATE HIMALAYA; from Nepal, *Wallich*, to Mishmi, *Griffith*, ascending to 5000 ft. KHASIA HILLS, alt. 2–4000 ft. The CONCAN, *Lisboa*.

Stems 3–5 ft., tufted, as thick as a duck's quill, quite smooth. *Leaves* 12–18 by ⅙–⅔ in., finely acuminate, flat, nearly smooth except the margins; sheath glabrous or margins and mouth villous; ligule of long silky hairs. *Panicle* 5–12 in., strict, rachis stout, either narrowly pyramidal with erecto-patent lower branches ¼–1½ in. long, or spiciform with short branches. *Involucel* of few green or purple stout bristles, ½ in. long or less. *Spikelets* ⅛–⅛ in., sessile, ovoid, green; gl. I = ½ III, acute or obtuse, 3-nerved; II shorter than IV, orbicular, subacute or obtuse, 9-nerved; III = IV, 7–9-nerved, paleate, male or neuter; IV oblong-ovoid, subacute turgid, white.—Very near *Setaria macrostachya*, H. B. & K. of tropical America and Australia, which differs more in habit than any other characters, having a much denser panicle and the leaves very much narrowed at the base. Both are closely allied to *Panicum plicatum*, but the leaves are not plicate.

UNDETERMINABLE, &C., SPECIES.

S. ? CANESCENS, *Kunth Rev. Gram.* i. 47, *Enum.* i. 157 = Panicum canescens, *Roth Nov. Sp.* 54; *Steud. Syn. Gram.* 54.

S. FIELDINGII, *C. Muell. in Bot. Zeit.* xix. (1861) 323. Not an Indian grass.

S. HIRTA, *Kunth Rev. Gram. & Enum. ll. c.c.* = Panicum hirtum, *Roth l. c.* 46. P. Rothii, *Spreng. Syst.* i. 310. Oplismenus? hirtus, *Roem. & Sch. Syst.* ii. 485. Echinochloa? hirta, *Schult. Mant.* ii. 270.

S. LUXURIANS, *Willd. Herb. ex Spreng. Syst.* i. 305; *Kunth Enum.* i. 156 = Panicum Willdenowii, *Steud. nom. Ed.* II. ii. 265, *Syn. Gram.* 54.

S. ASPERA, *Miq. Fl. Ind. Bat.* iii. 469.

14. PENNISETUM, *Pers.*

Annual or perennial grasses. *Infl.* of involucellate spikelets articulate (in Indian species) on the rachis of a simple spike; involucels of unequal scabrid or plumose filiform simple or branched bristles. *Spikelets* 1–3 in each involucel, sessile or very shortly pedicelled, inarticulate at the base and persistent, 1–2-fld., ovoid, glabrous or sparsely hairy. *Glumes* 3–4, I–III hyaline; I smallest or 0, II and III 5-nerved, subequal or II shortest, rarely absent; III paleate or not, male or neuter; IV coriaceous, bisexual or fem., articulate at the base and deciduous. *Stamens* 3, anthers long. *Styles* long, free or connate below. *Grain* free within the gl., oblong, orbicular or pyriform.—Species probably 30–40 of all warm countries.

The synonomy of the species is almost inextricable, and as here given for the Indian species is open to correction in some cases. Dr. Stapf has kindly revised them with me.

Sect. I. PENICILLARIA. *Anther-cells* with bearded tips. *Styles* connate.

P. TYPHOIDEUM, *Rich. in Pers. Syn.* i. 72; *Del. Fl. Ægypt.* 17, t. 8, f. 3; *Trin. Diss.* ii. 71 (typhoides); *Boiss. Fl. Orient.* v. 447; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 11, *Field & Gard. Crops*, 30, t. 71, *Fodd. Grass. N. Ind.* 18; *Lisboa, in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 339. P. alopecuroides, *Spreng. Syst.* i. 303 (*in part*). P. cereale, *Trin. in Mem. Acad. Petersb. Ser.* vi. iii. II (1835) 185. P. cylindricum, *Sw. ex Trin. Diss.* ii. 70. P. giganteum, *Tenore ex Steud. Nom. Ed.* II. ii. 297. P. Linnaei, *Kunth Revis. Gram.* i. 49. P. megastachyum, *Steud. Syn. Gram.* 108. P. spicatum, *Roem. & Sch. Syst.* ii. 499. P. violaceum, *Rich. in Pers. Syn.* i. 72. Penicillaria alopecuroides, *Sweet Hort. Brit. Ed.* I. 440; *A. Braun Ind. Sem. Hort. Berol.* (1855), *App.* 25. Penic. ciliata, *Willd. Enum. Hort. Berol.* 1037. Penic. chinensis, *Nees ex A. Br. l. c.* 26. Penic. cylindrica, *Roem. & Sch. l. c.* 498 (*non Nees*). Penic. fallax, *Fig. & Not. in Mem. Acad. Tor.* II, xii. (1852) 371. Penic. involucrata, *Schult. Mant.* ii. 283; *Schlecht. in Linnæa*, xxv. (1852), 565. Penic. nigritarum & Sieberiana, *Schlecht. l. c.* 561, 565. Penic. Plukeneti, *Link Enum. Hort. Berol.* i. 221; *Nees Fl. Afr. Austr.* 72. Penic. Roxburghii, *A. Br. & Bouché Ind. Sem. Hort. Berol. l. c.* 26. Penic. typhoidea & Raddiana, *Fig. & Not. l. c.* 371, 373. Penic. solitaria, *Stokes Bot Mat. Med.* i. 129. Penic. spicata, *Willd. l. c.*; *Beauv. Agrost.* 58, t. 13, f. 4; *Wall. Cat.* n. 8644; *Anderss. in Walp. Ann.* vi. 966; *Kunth Enum. Pl.* i. 165, *Suppl.* 120, t. 11, f. 1; *Jacq. Eclog. Gram.* t. 17; *Aitchis. Cat. Panjab. Pl.* 163. Panicum spicatum, *Roxb. Fl. Ind.* i. 283. Pan. americanum, *Linn. Sp. Pl.* 56. Cenchrus alopecuroides, *Thunb. Prodr. Fl. Cap.* 24. C. paniceus, *Heyne ex Wall. Cat.* n. 8650. C. spicatus, *Cav. Descr.* 304, 614. Holcus paniciformis, *Roxb. Ic. ined.* n. 896. H. racemosus, *Forsk. Fl. Æg. Arab.* 175. H. spicatus, *Linn. Syst. Ed.* x. 1305; *Grah. Cat. Bomb. Pl.* 238; *Dalz. & Gibs. Bomb. Fl. Suppl.* 99. Alopecurus indicus, *Linn. Syst. Ed Murray* 92 (*excl. Syn. Pluk.*). A typhoides, *Burm. f. Fl. Ind.* 27.—Penicillaria, *Wall. Cat.* n. 8644, 8650.

Throughout the hotter parts of INDIA, cultivated or an escape; also all Africa and S. Europe.

Annual. *Stem* 3–6 ft., erect, simple, or branched from the root, slender or stout, sometimes as thick as the middle finger at the base, solid, leafy, upper nodes glabrous or woolly, lower rooting. *Leaves* 1-3 ft. by $\frac{1}{4}$–2 in., lanceolate, spreading and drooping, flat, more or less hairy; midrib stout or slender; sheath rather inflated; ligule of hairs. *Peduncle* more or less woolly below the spike. *Spike* 6–12 in. by $\frac{1}{4}$–$1\frac{1}{2}$ in. diam., erect, cylindric, dense-fld.; rachis hairy or woolly, branchlets 1–8-fld., concealed by the densely packed spikelets; bristles of involucel more or less unilateral, as long as the spikelets or longer, scabrid and ciliate, white or colrd. *Spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in., usually solitary in the involucel, oblong ovate or ovate-lanceolate, pedicelled, pedicel ciliate; gl. I minute or 0, $\frac{1}{2}$-orbicular or subquadrate, 1–3-nerved; II very variable in length, sometimes absent, usually $\frac{1}{6}$–$\frac{1}{2}$ IV, subquadrate, truncate, obtuse or retuse 3-nerved, very rarely as long as IV and coriaceous; III ovate-oblong, obtuse or truncate and apiculate, 5-nerved, epaleate or paleate, and male or neuter, rarely bisexual; IV coriaceous or herbaceous, ovate, acute, 5–7-nerved; palea very broad, truncate, ciliate at the tip and dorsally, nerves 2 approximate excurrent. *Lodicules* 0. *Anthers* linear. *Grain* oblong, obovoid, or pyriform, smooth, free, and top exposed.—Only known in cultivation or as an escape, and it is difficult to say whether the many known forms originated in one or more species. Alph. De Candolle unfortunately does not include it in his "Origine des Plantes Cultivées." Its abundance throughout Africa would point to that continent as its source. There are very great differences in the number, sizes, and shapes of the glumes, of I and II especially, which are not unfrequently both absent. The materials are not sufficient to enable me to attempt a classification of the numerous forms cultivated or growing as escapes in India. To do this would require an exhaustive examination of the African forms, of which there are legions. I can only refer to Schlechtendahl's paper in the Linnæa, xxv. (1852) 530, to Kornicke & Werner's Handb. der Getreidebaues (i. 291), and to Braun's descriptions of 22 cultivated forms, chiefly African, in Walp. Ann. vi. 961. Roxburgh alludes to five varieties as cultivated in India, but does not distinguish them. The following five are selected as noteworthy.

1. Tall, very stout, leaves broad, spike very stout (Typha-like), 8–12 by 1–$1\frac{1}{2}$ in. diam., involucels on long ciliate pedicels with sometimes a superposed one, bristles much longer than the spikelets, dark brown; spikelets clustered in the involucels or chiefly in the upper involucel if present, ovoid or oblong, gl. I minute semilunar or 0, II 0 or like I or larger and quadrate truncate 3-lobed 3-nerved, III = IV 5-nerved, paleate, palea very broad quadrate entire or 2-fid. 2-nerved dorsally villous, IV 7-nerved emarginate apiculate, palea as in III.—The largest cult. form. *Wall. Cat.* n. 8644.

2. Spike cylindric 7 by $\frac{2}{3}$ in., involucels shortly pedicelled, bristles shorter than the spikelet pale, spikelets 1–3 $\frac{1}{10}$ in., gl. I and II minute semilunar, III broadly oblong paleate and 3-nerved, palea dorsally villous, IV 7-nerved nerves and margins ciliate, palea as in III.—N.W. India, *Royle.*

3. Tall, erect, spike 4–5 in., stem densely villous towards the top, involucels shortly pedicelled, bristles longer than the spikelets pale or purplish, spikelets subsolitary $\frac{1}{6}$ in. elliptic-lanceolate, gls. 3, I 0, II = $\frac{1}{2}$–$\frac{2}{3}$ IV oblong truncate 5-nerved paleate, III ovate cuspidate 5-nerved.—A very common cult. form. Lahore, *Stewart.*—Alopecurus indicus, *Hb. Heyne.*

4. Stem slender 12–18 in., leaves very narrow, spike 1 in. rather slender, involucels shortly pedicelled, bristles longer than the spikelet, pale, spikelets subsolitary ovate, gls. 3, I minute semilunar, II = $\frac{1}{2}$ III subquadrate 3-nerved, III ovate tip truncate and mucronate strongly 5-nerved, nerves and tip ciliate.—Monghyr.

5. Spike 4–7 in., involucels shortly pedicelled, bristles much longer than the spikelets very pale, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. narrowly lanceolate, glumes 3 all membranous, I minute, II = $\frac{1}{3}$ III oblong truncate 3-nerved, III elliptic-lanceolate strongly 3-nerved tip emarginate mucronate, palea narrow oblong-lanceolate smooth, anther cells most minutely bearded, ovary produced into a flexuous compressed twisted

awn an inch long. Penicillaria cylindrica, *R. & S.*; *Wight Cat.* n. 1662.—A diseased form.

Sect. II. PENNISETUM proper. Anther-cells not bearded.

* Bristles of involucel all free to the base, slender.

† *Bristles branched.*

1. **P. lanatum,** *Klotzsch in Bot. Erg. Waldem. Reise,* 65, t. 93. P. sericeum, *Munro mss.* P. nepalense, *Griseb. in Goett. Nachr.* (1868) 302 (*non Spreng.*)

WESTERN HIMALAYA, alt. 7–9000 ft.; from Kashmir to Garwhal, and WESTERN TIBET, *Jacquemont,* &c.

Perennial; rootstock often stout, woody, creeping and branching; stem 1–3 ft. *Leaves* 6–18 by $\frac{1}{6}$–$\frac{1}{2}$ in., flat, glabrous hairy or silkily villous. *Spikes* 2–5 in., $\frac{1}{2}$–$\frac{2}{3}$ in. diam., pale green; peduncle and rachis more or less villous; involucels pedicelled, densely imbricate. *Spikelets* $\frac{1}{5}$ in., solitary in the involucels, rather shorter than the scabrid and sparsely ciliate branching bristles; gl. I = $\frac{1}{4}$ III, ovate, acute; II = $\frac{1}{2}$ IV, oblong, obtuse, 3-nerved, III and IV lanceolate, acuminate, 5-nerved.

†† *Bristles unbranched, scaberulous, not or sparingly ciliate.*

2. **P. Alopecuros,** *Steud. Syn. Gram.* 102 (*non Jacq.*); peduncle and rachis of spike glabrous, spikelets $\frac{1}{3}$ in. solitary narrowly lanceolate, gl. I minute, II = $\frac{1}{3}$ III oblong obtuse 1–3-nerved, III lanceolate acuminate 7–11-nerved, IV subulate-lanceolate 5-nerved. *Duthie Grass. N.W. Ind.* 10; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1890) 338. P. Hohenackeri, *Hochst. ex Steud. l. c.* 103. P. aureum, *Dalz. & Gibs. Bomb. Fl.* 294; ? *Link. Hort. Berol.* i. 215. Gymnothrix Alopecuros, *Nees in Wight Cat.* n. 1663; *Steud. l. c.* G. cenchroides, *Roem. & Sch. Syst.* ii. 499; *Kunth Enum. Pl.* i. 155; *Wight ex Steud Syn. Gram.* 102. Cenchrus hordeiformis, *Herb. Rottl. ex Steud. l. c.* 102 (*non Thunb.*). Panicum helvolum, *Herb. Madr. ex Wall. Cat.* n. 8652 A. Pan. hordeiforme, *Thunb. Fl. Japon.* 46 (*partly*). —Gymnothrix? *Wall. Cat.* n. 8652.

RAJPUTANA; swamps on Mt. Abu, *Duthie.* The CONCAN, *Stocks,* &c. NILGHIRI HILLS, alt. 5500 ft.

Perennial. *Stems* 2–3 ft., stout, erect, densely tufted below, subdistichously branching upwards; branches strict, erect. *Leaves* 12–18 by $\frac{1}{10}$–$\frac{1}{6}$ in., coriaceous, convolute, glabrous, base and flattened distichous sheath often villous; ligule of hairs. *Spikes* 5–7 in., usually pale green; rachis flexuous; involucels very shortly pedicelled; bristles few, very unequal, nearly straight, longest 2–3 times as long as the spikelet, bases quite free; gl. I suborbicular.—Habit of *P. compressum.* The *P. aureum* of the Bombay Flora is, I do not doubt, *P. Alopecuros,* but what *P. aureum* of Link may be is uncertain.

3. **P. flaccidum,** *Griseb. in Goett. Nachr.* (1868) 86; peduncle and rachis of spike glabrous, spikelets $\frac{1}{6}$ in. solitary ovate-lanceolate, gl. I very small orbicular or 0, II = $\frac{2}{3}$ IV lanceolate 5-nerved, III and IV ovate-lanceolate subsetaceously acuminate 5-nerved. *Duthie Grass. N.W. Ind.* 10. P. mongolicum, *Franch. mss.* Gymnothrix flaccida, *Munro ex Aitchis. Cat. Panjab. Pl.* 163.

Temperate and alpine HIMALAYA, alt. 5–11,000 ft.; from Kashmir to W. Nepal and WESTERN TIBET.—DISTRIB. Affghan., Central Asia.

Perennial. *Stem* 6–24 in., densely tufted, creeping below, branching at the base only, slender above. *Leaves* 5–10 by $\frac{1}{6}$–$\frac{1}{4}$ in., flat, glabrous or sparsely hairy, base

contracted, mouth of the often ciliate sheath bearded. *Spikes* 2–6 in., rather slender, very pale, often flexuous; involucels subsessile; bristles nearly straight or flexuous, one often very much the longest, all free to the base.

4. **P. compressum,** *Br. Prodr.* 193; tip of peduncle and rachis of spike more or less villous, spikelets ¼ in. solitary lanceolate, gl. I minute or 0, II = ⅓–½ III ovate-lanceolate acute or obtuse 1-nerved, III ovate acuminate 5–7-nerved epaleate, IV = III 5-nerved. *Schrad. in Linnæa*, xii. (1838) 431; *Benth. Fl. Austral.* vii. 495; *Steud. Syn. Gram.* 102. P. alopecuroides, *Spreng. Syst.* i. 303 (*in part*). P. chinense, *Steud. l. c.* 108. P. cynosuroides, *Wall. Cat.* n. 8653. P. hordeiforme, *Spreng. Syst.* i. 302. P. nigricans, *Trin. ex Steud. Nom. Ed.* II. ii. 297, *Syn. Gram.* 103. P. japonicum, *Trin. in Spreng. Neue Entdeck.* ii. 76, *Diss.* ii. 63, *Pan. Gen.* 88, *Sp. Gram. Ic.* t. 19; *Franch. et Savat. Enum. Pl. Jap.* ii. 164. Penicillaria chinensis, *Nees ex Steud. l. c.* Gymnothrix compressa, *Brongn. Voy. Coq. Bot.* 103. ? G. cenchroides, *Roem. & Sch.* i. 499 (*in part*). G. hordeiformis, *Nees in Linnæa*, vii. (1832) 276. G. japonica, *Kunth Enum. Pl.* i. 158. G. nigricans, *Presl Rel. Haenk.* i. 315. G. purpurascens, *Sw. ex Trin. Diss.* ii. 64, *Pan. Gen. l. c.* ? Cenchrus hordeiformis, *Thunb. Prodr. Pl. Cap.* 24. C. purpurascens, *Thunb. in Trans. Linn. Soc.* ii. (1794) 329. Setaria compressa, *Kunth Revis. Gram.* 46, *Enum.* i. 150. Panicum alopecuroides, *Linn. Sp. Pl.* 55. P. aristidoides, *Willd. ex Spreng. Syst.* i. 302. Pan. asperum, *Link. Enum. Hort. Berol.* i. 75 (*non Sch.*?). Pan. hordeiforme, *Thunb. Fl. Jap.* 46, t. 9 (*excl. cit. Afr.*). ? Alopecurus hordeiformis, *Linn. Sp. Pl.* 60.—Gymnothrix, *Wall. Cat.* n. 8653.

BURMA; Taong Dong, *Wallich*; Shan Hills, alt. 4000 ft., *Manders.*—DISTRIB. China, Japan, Tonkin, Australia.

Perennial; stem 1–2 ft., densely tufted. *Leaves* 12–18 in., very narrow, convolute, silkily villous towards the base; sheath glabrous or ciliate; ligule obscure. *Spikes* 2–4 in., purplish in Indian specimens; involucels pedicelled, pedicels villous; bristles few, very unequal, one or two much longer than the rest and an inch long, all free at the base.—Trinius refers to *P. compressum*, the *Alopecurus hordeiformis*, Linn. (*Cenchrus hordeiformis*, Thunb., *Gymnothrix cenchroides*, R. & S.), which appear to me to be more probably *P. Alopecurus*.

5. **P. dichotomum,** *Delile Fl. Ægypt.* 159, t. 8, f. 1; stem dichotomously branched rigid, peduncle and rachis glabrous, spikelets ⅓ in. usually solitary lanceolate, gl. I = ⅔ III ovate-lanceolate acuminate, II = III lanceolate acuminate 5–7-nerved, III = IV both 5-nerved. *Trin. Diss.* ii. 66, *Pan. Gen.* 94; *Kunth Enum. Pl.* i. 161, *Suppl.* 110; *Steud. Syn. Gram.* 105; *Boiss. Fl. Orient.* v. 444; *Aitchis. Cat. Panjab. Pl.* 162; *Duthie Grass. N.W. Ind.* 10. P. phalaroides, *Schult. Mant.* ii. 147; *Nees Agrost. Bras.* 283. Gymnothrix longiglumis, *Munro in Cat. Griff. &c. Pl.* 56 (*name*). Cenchrus ramosissimus, *Poir. Encycl.* vi. 51; *Dalz. & Gibs. Bomb. Fl.* 294. Phalaris setacea, *Forsk. Fl. Ægypt. Arab.* 20. Panicum dichotomum, *Forsk. l. c.*; *Steud. l. c.* 105.

PANJAB and the N.W. PROVINCES (fid. *Duthie*). PESHAWUR, *Aitchison.* SIND and GUZERAT; on sand hills, *Stocks.*—DISTRIB. Affghan. and westwards to N. Africa.

Perennial, quite glabrous, bushy. *Stems* distantly branched; internodes long, rigid, polished; branches sometimes fascicled. *Leaves* short, rigid, convolute. *Spikes* 3–5 in., cylindric, pale, nearly white; rachis scabrid; bristles of sessile involucel, very many, slender, flexuous, pale, the longer nearly twice as long as the spikelet, inner stouter somewhat plumose, all free at the base.—I have seen no specimens from the Panjab or the N.W. Provinces.

6. **P. parviflorum,** *Trin. Diss.* ii. 65, *Sp. Gram. Ic.* t. 288; annual, erect, peduncle and rachis glabrous, spike very narrow purple, spikelets $\frac{1}{8}$ in. solitary narrowly lanceolate, gl. I minute suborbicular, II longest truncate cuspidate 5-nerved, III = $\frac{3}{4}$ II truncate toothed 5-nerved paleate male, IV = III lanceolate obtuse nerveless shining. *Steud. Syn. Gram.* 103. P. imberbe, *Edgew. in Journ. Linn. Soc.* xxi. (1852) 181 (*name*); *Steud. Syn. Gram.* 104; *Duthie Grass. N.W. Ind.* 10, *Indig. Fodd. Grass.* t. 50, *Fodd. Grass. N. Ind.* 18. Gymnothrix hordeoides, *Kunth Revis. Gram.* i. 48, *Enum.* i. 60. Panicum hordeoides, *Poir. in Lam. Illust.* i. 170. Alopecurus rubicundus, *Herb. Ham. ex Wall. Cat.* n. 8646 B.

Rajputana; at Oodeypore, *Wingate* (*Herb Duthie*). Behar, on Parusnath, and at Hazaribagh, *Clarke*.—Distrib. tropical Africa.

Stem 2–3 ft., branching upwards, leafy, branches erect. *Leaves* 4–10 by $\frac{1}{6}$–$\frac{1}{3}$ in., flat, base and mouth of sheath ciliate. *Spikes* 3–5 by $\frac{1}{4}$–$\frac{1}{3}$ in. diam.; rachis very slender, strict, as it were crenate from the projections between the close-set spikelets; bristles of sessile involucel very slender, quite free, a few 4–6 times as long as the spikelet.—Closely allied to *P. setosa*. Probably not indigenous in India.

†† *Bristles unbranched, inner copiously ciliate or lanate.*

7. **P. orientale,** *Rich. in Pers. Syn.* i. 72; perennial, rachis of spike hairy, spikelets 2–5 in each pedicelled involucel $\frac{1}{6}$ in. lanceolate, gl. I = III ovate or oblong nerveless, II shorter than IV ovate-lanceolate acuminate 3-nerved, III longest aristately acuminate 5-nerved, IV oblong-lanceolate aristate shining. *Trin. Diss.* ii. 69; *Kunth Enum. Pl.* i. 162, ii. 117; *Griseb. in Ledeb. Fl. Ross.* iv. 472; *Coss. & Dur. Fl. Alger.* ii. 39; *Boiss. Fl. Orient.* v. 445; *Duthie Grass. N.W. Ind.* 10. P. araneosum, *Edgew. in Journ. Beng. As. Soc.* xxi. (1852), 180; *Steud. Syn. Gram.* 105; *Aitchis. Cat. Panjab. Pl.* 162; *Duthie Grass. N.W. Ind.* 10. P. asperifolium, *Kunth Revis. Gram.* i. 49, *Enum. Pl. l. c.* P. elatum, *Hochst. ex Steud. Nom. Ed.* II. ii. 297. P. fasciculatum, *Trin. in Mem. Acad. Petersb. Ser.* 6, iii. 11. (1835) 181. P. Griffithii, *Munro Cat. Pl. Griff. &c. ined.* 56. P. macrostachyum, *Fresen. in Mus. Senkenb.* ii. 135 (*non Trin.*). P. persicum, *Boiss. & Buhse in Nov. Mem. Soc. Nat. Mosc.* xii. (1860) 232. P. phalariforme, *Steud. Syn. Gram.* 106 (*ex descript.*). P. Ruppellii, *Steud. Nom. l. c.* 298. P. sinaicum, *Decne in Ann. Sc. Nat. Ser.* 2, ii. (1834) 11; *Aitchis. l. c. Duthie l. c.* P. tenue & variabile, *Fig. & Notar. in Mem. Accad. Torin Ser.* 2, xii. (1852), 246, 248. P. tiberiadis, *Boiss. Diagn. Ser.* I. xiii. 43. Cenchrus asperifolius, *Desf. Fl. Atlant.* ii. 388. C. hordeiformis, *Pers. l. c.* 71 (*non Lamk.*). C. orientalis, *Willd. ex Trin. Diss.* ii. 69; *Kunth l. c.* 162. Panicum orientale, *Willd. Enum. Hort. Berol.* ii. 1031.

Western Himalaya, from Kashmir to Kumaon, alt. 3–6000 ft. The Panjab, Sindh, the Concan and Behar (on Parusnath, alt. 2000 ft., *Clarke*).—Distrib. Westward to Asia Minor and N. Afr.

Stem 2–6 ft., erect or ascending from a densely tufted often stout creeping branching rootstock. *Leaves* 1–2 ft. by $\frac{1}{6}$–$\frac{1}{2}$ in., narrowly linear, flat or subconvolute, glabrous or hairy. *Spike* 5–16 in.; rachis stout, subterete, not grooved or notched; pedicels of involucels hispid; bristles $\frac{2}{3}$–$\frac{3}{4}$ in., all very slender, flexuous, often purplish, very unequal, villous below, quite free at the base; spikelets on the short branches of a hispid pedicel, outer often imperfect.

Var. *triflorum*, Stapf mss.; spike elongate dense-flowered. P. triflorum, *Nees in Herb. Royle*; *Steud. l. c.* 107.

8. **P. pedicellatum,** *Trin. in Mem. Acad. Petersb. Ser.* vi. iii.

II. (1835) 184; annual, spikes dense-fld., rachis glabrous, spikelets $\frac{1}{8}$ in. solitary or geminate shortly pedicelled in the sessile involucels, bristles densely villous, gl. I very small oblong woolly, II broadly oblong apiculate 7-nerved, III = IV truncate 5-nerved tip toothed, IV lanceolate acute smooth shining. P. lanuginosum, *Hochst. in Flora* xxv. (1842), *Beibl.* i. 133; *A. Rich. Tent. Fl. Abyss.* ii. 385; *Steud. Syn. Gram.* 107; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 339. P. amoenum, *A. Rich. l. c.* 386. P. lanatum, *Herb. Ham. ex Wall. Cat.* n. 8647. P. implicatum, *Steud. l. c.* 107 (*ex descr.*). P. intertextum, *Schlecht. in Bot. Zeit.* ix. (1851) 878. Eriochaeta densiflora, nervosa & secundiflora, *Fig. et De Not. in Mem. Acc. Torin.* Ser. II. xiv. (1854) 375–378.—Pennisetum, *Wall. Cat. l. c.*

RAJPOOTANA and BANDA; on Mt. Abu, *Duthie*. BEHAR, at Monghyr, *Hamilton*; Hazaribagh and on Parusnath, *Clarke*.—DISTRIB. Afr. trop.

Stems 1–3 ft., branched from the base and above, leafy. *Leaves* 6–10 by $\frac{1}{6}$–$\frac{1}{3}$ in., flat, flaccid, glabrous or sparsely hairy. *Spikes* 2–5 in.; rachis notched; involucels quite sessile; outer bristles short, inner $\frac{1}{3}$ in. long, densely villous below the middle, flexuous, very unequal, pale. *Spikelets* with the pedicel and often the base of the lower glumes woolly; tip of gl. IV hispid.

9. **P. setosum,** *Rich. in Pers. Syn.* ii. 729 (*excl. syn.*); annual, peduncle and rachis of spike glabrous, spikelets $\frac{1}{10}$ in. solitary in the sessile involucels, bristles $\frac{1}{4}$–$\frac{1}{3}$ in. sparsely ciliate, gl. I minute or 0, II oblong cuspidate 5-nerved, III shorter than II oblong truncate 3-toothed 5-nerved, IV ovoid tip ciliate. *Trin. Diss.* ii. 66, *Pan. Gen.* 95, *Sp. Gram. Ic.* t. 20; *Nees in Mart. Fl. Bras.* ii. II. 305; *Griseb. Fl. Brit. W. Ind.* 555; *Baker Fl. Maurit.* 441. P. barbatum, *Schult. Mant.* ii. 147; *Nees Agrost. Bras.* 283; *Kunth Enum. Pl.* i. 163; *Steud. Syn. Gram.* 108. P. breve, *Nees l. c.* 281. P. ciliatum, *Parl. in Hook. Niger Flora*, 184. P. ciliares, *Herb. Ham. ex Wall. Cat.* n. 8640 A. P. dasystachum, *Desv. Opusc.* (*ex descr.*) 76. P. elegans, *Nees ex Steud. l. c.* 105. P. flavescens, *Presl Rel. Hænk.* i. 316 (*ex descr.*). P. hirsutum, *Nees Agrost. Bras.* 284. P. holcoides, *Schult. l. c.* 148; *Duthie Grass. N. W. Ind.* 10, *Indig. Fodd. Grass.* t. 49, *Fodd. Grass. N. Ind.* 17. P. gracile, *Benth. in Hook. Niger Fl.* 564. P. intertextum, *Herb. Ham. ex Wall. Cat.* 8648. P. myurus, *Parl. in Atti Riun. Ott. Sc. Ital.* 586. P. pallidum, *Nees Agrost. Bras.* 185 (*ex descr.*). P. polystachyum, *Schult. l. c.* 146; *Nees in Hook. Niger Fl.* 563. P. purpurascens, *H.B. & K. Nov. Gen. & Sp.* i. 113; *Nees l. c.* 282; *Kunth l. c.* 160. P. Richardi, *Kunth Revis. Gram.* i. 49, 255, t. 39, *Enum.* 161. P. Sieberi, *Kunth Revis.* i. 49 (*ex parte*) ii. 877. P. tenuispiculatum, *Steud. l. c.* 107 (*ex descr.*) P. triticoides, *Roem. & Sch. Syst.* ii. 877. P. uniflorum, *H.B. & K. l. c.* t. 34. P. violaceum, *Hort. ex Trin. Diss.* ii. 67 (*non Rich.*). Gymnothrix Thouarii, *Herb. Ham. ex Wall. Cat.* n. 8645 A. (*non Beauv.*). Penicillaria ciliaris, *Herb. Ham. l. c.* n. 8646 A. Panicum Alopecuros, *Lamk. Ill.* i. 169; *Encycl.* iv. 739. Pan. barbatum, *Roxb. Fl. Ind.* i. 282; *Wall. Cat.* n. 8646 C. Pan. cenchroides, *Rich. in Act. Soc. Hist. Nat. Par.* i. (1792) 106. Pan. densispica, *Poir. Encycl. Suppl.* iv. 273. Pan. holcoides, *Roxb. l. c.* 285, *Ic. ined.* n. 784. Pan. polystachyum, *Schult. Mant.* ii. 146. Pan. triticoides, *Poir. l. c.* 274. Setaria cenchroides, *Roem. & Sch. Syst.* ii. 495. Cenchrus setosus, *Sw. Prodr. Veg. Ind. Occ.* 26 (*excl. syn.*). —Penniseti sp., *Wall. Cat.* n. 8646, 8648.

UPPER GANGETIC PLAIN, at Cawnpore (*Herb. Wight*). The CIRCARS; in cultivated ground among the mts., *Roxburgh*. BENGAL, BEHAR, and CHOTA NAGPORE. —DISTRIB. Afric. and Amer. trop.

Stem erect, often stout and fastigiately branched at the nodes, green or purplish. *Leaves* 6–10 by $\frac{1}{4}$–$\frac{3}{4}$ in., flat, flaccid, glabrous or hairy. *Spikes* few or many, 2–4 in., usually purplish brown; rachis slender, deeply pitted; involucels close-set, at length spreading; bristles laxly but copiously ciliate below the middle, all slender and free at the base; gl. II. suddenly or gradually cuspidate; III with two obtuse lateral teeth at the tip and an acute median. *Styles* free at the base.—Possibly not indigenous in India.

10. **P. borbonicum,** *Kunth Revis. Gram.* i. 259, t. 41, *Enum. Pl.* i. 162, *Suppl.* 118; habit, &c. of *P. setosum*, but spikes longer 1 in. diam. across the bristles, spikelets $\frac{1}{6}$ in., gl. II much longer than III acuminate. Gymnothrix Thuarii, *Beauv. Agrost.* 59. G. Thouarii, *Steud. Nom. Ed.* II.; 386. Panicum longisetum, *Poir. Encyc.* iv. 275 (*Excl. Syn. Beauv.*).—Pennisetum sp. *Wall. Cat.* n. 8645.

Bengal; at Serampore, *Carey*; margins of fields, &c., *Kurz.* Silhet, *Griffith.* —Distrib. Bourbon.

A very doubtful native of India.

** Inner bristles of involucel dilated below, their bases confluent in a coriaceous disk.

11. **P. cenchroides,** *Rich. in Pers. Syn.* i. 72; peduncle and rachis of spike glabrous, spikelets $\frac{1}{6}$ in. 1–3 in each pedicelled involucel, gl. I = $\frac{1}{2}$ III ovate acuminate nerveless, II = $\frac{1}{2}$ IV ovate acuminate 1-nerved, III oblong truncate 5-nerved, IV lanceolate truncate or cuspidate. *Beauv. Agrost.* 59, t. 13, f. 5; *Trin. Fund. Agrost.* 171, t. xv., *Diss.* ii. 69, *Pan. Gen.* 93; *Nees Agrost. Bras.* 184, *Fl. Afr. Austr.* 70, *in Linnæa*, vii. 162; *Kunth Enum. Pl.* i. 162; *Suppl.* 119; *Parlat. Fl. Ital.* i. 108, *in Webb. & Berth. Phyt. Canar.* iii. III. 380, t. 244; *Steud. Syn. Gram.* 105; *Boiss. Fl. Orient.* v. 445; *Baker Fl. Maurit.* 441; *Wall. Cat.* n. 8649; *Aitchis. Cat. Panjab. Pl.* 162; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* v. (1891) 338; *Duthie Grass. N.W. Ind.* 10, *Indig. Fodd. Grass.* t. 12, 13, *Fodd. Grass. N. Ind.* 17. P. ciliare, *Link. Hort. Berol.* i. 213; *Coss. & Dur. Fl. Alger.* ii. 38. P. incomptum, *Nees ex Steud. l. c.* 105 (*ex descr.*). P. distylum, *Guss. Ind. Sem. Hort. Bocc.* 8, *Fl. Sic. Prodr.* i. 12; *Bertol. Fl. Ital.* i. 393. P. petreum, *Steud. l. c.* 106. ?P. Vahlii, *Kunth Revis.* i. 49. P. rufescens, *Spreng. Syst.* i. 302; *Kunth l. l. c. c.* 162, ii. 117. *Steud. l. c.* Cenchrus Anjania, *Herb. Ham. ex Wall. Cat.* n. 8649 B. C. ciliaris, *Linn. Sp. Pl.* 302; *Desf. Fl. Atlant.* ii. 387. C. digynus, *Schreb. ex Boiss. l. c.* 449. C. longifolius, *Hochst. ex Steud. l. c.* C. mutabilis, *Wight. Herb.* C. pennisetiformis, *Hochst. et Steud. ex Boiss. l. c.* 448. C. rufescens, *Desf. l. c.* 388. Panicum vulpinum, *Willd. Enum. Hort. Berol.* 1031.

Plains and low hills throughout Western India, from Kashmir to the Upper Gangetic plain and southwd. (Absent from Ceylon.)—Distrib. Westwd. to Sicily, trop. Afr. and the Canaries.

Stems tufted, 6–18 in., erect or decumbent and much branched from the base, stout or slender, leafy, or ascending from a branching often nodose rootstock, the sheaths of which are often woolly. *Leaves* 6–10 by $\frac{1}{8}$–$\frac{1}{6}$ in., glabrous hairy or villous. *Spikes* $1\frac{1}{2}$–4 in., pale, rarely purplish; peduncle often flexuous; rachis scaberulous; involucels subsessile, outer bristles slender, squarrosely spreading; inner twice as long as the spikelets, thickened and ciliate below, filiform flexuous and scabrid above. *Spikelets* 3, polygamous, gl. III male or sometimes fem. with an obcordate ovary; IV coriaceous; styles nearly free at the base.

Var. *echinoides*; inner bristles of the involucel shortly connate above the basal disk. Cenchrus echinoides, *Wight ex Steud. Nom. Ed.* II. i. 317; *Syn. Gram.* 109.

C. bulbosus, *Fresen. ex Steud. l. c.* C. pennisetiformis, *Hochst. ex Steud. l. c.* 109. C. setigerus, *Herb. Heyne ex Wall. Cat.* n. 8649 A.; *Aitchis. Cat. Panjab. Pl.* 162. C. lappaceus, *Tausch in Flora* XX. (1837) 57.—The Panjab, Upper Gangetic Plain, and Deccan Peninsula, Arabia, Africa, Madeira. A nearer approach to *Cenchrus* than *P. cenchroides*, but at once distinguishable from that genus by the filiform tips of the bristles of the involucel. It occurs here and there in the same areas as *P. cenchroides*, and passes into it.

12. **P. Prieurii,** *Kunth Revis. Gram.* ii. 411, t. 119, *Enum. Pl.* i. 162, *Suppl.* 119; habit of *P. cenchroides*, but involucel nearly twice as large, the longer bristles ¾ in. long, the spikelets one or two sessile and gl. I minute or 0. *Steud. Syn. Gram.* 105. Cenchrus macrostachyus, *Hochst. ex Steud. l. c.* 109.

The PANJAB; *Drummond* (*Herb. Duthie*). RAJPUTANA; at Jeypoor, *Duthie.*—DISTRIB. Afr. trop.

Quite glabrous. *Stems* tall, slender, erect, or short prostrate stout and much branched, with geniculate leafy branches. *Leaves* 1–8 in., rigid, narrow with filiform tips, scaberulous; sheath inflated; ligule of very fine hairs. *Spikes* on long exserted or short included peduncles, 2–4 in. long, 1½ in. diam. across the bristles, very pale; rachis slender, geniculately flexuous, compressed, quite smooth; involucels subsessile; bristles 1 in. flexuous, dilated and ciliate below. *Spikelets* ⅛ in.; gl. I 0; II = III both ovate-lanceolate, cuspidately acuminate, 5-nerved; IV like III, but rather longer, 5-nerved; palea like the gl., 2-nerved. *Anthers* linear. *Grain* broadly orbicular-oblong, cuspidate, flattened.

DOUBTFUL SPECIES.

P. NEPALENSE, *Spreng. Syst.* i. 303 (to which Grisebach refers *lanatum*, Kl.) differs according to the description from *lanatum* in the coloured setæ, which are not described as branched, and in the habitat, Nepal, which is far to the east of the range of *lanatum*. Sprengel's specimen is in all probability from Wallich, who alone had distributed plants from Nepal at that time.

15. CENCHRUS, *Linn.*

Characters of *Pennisetum*, but involucels composed of subulate hard spines without filiform tips, connate below into a short coriaceous cup, which is surrounded by erect or squarrose bristles.—Species few, tropical and subtropical.

1. **C. biflorus,** *Roxb. Fl. Ind.* i. 233; involucels rounded at the base, inner spines subulate-lanceolate erect puberulous dorsally flat with thickened margins, outer short or long erect or sub-squarrose. *Kunth Enum. Pl.* i. 167; *Steud. Syn. Gram.* 110; *Wight Cat.* n. 1664; *Dalz. & Gibs. Bomb. Fl.* 294; *Aitchis. Cat. Panjab. Pl.* 163 (triflorus); *Duthie Grass. N.W. Ind.* 9. C. bulbifer, *Hochst. ex Boiss. Fl. Orient.* v. 448. C. echinatus, *Wall. Cat.* n. 8854 B.C. C. montanus, *Nees in Royle Ill. Himal. Pl.* 416 (*name*); *Steud. l. c.* 111; *Boiss. l. c. Aitchis. l. c.*; *Duthie Grass. N.W. Ind.* 9, *Indig. Fodd. Grass.* t. 48, *Fodd. Grass. N. Ind.* 16. C. quinquevalvis, *Herb. Ham. ex Wall. l. c.* C. C. Schimperi, *Hochst. ex Steud. Nom. Ed.* II. i. 317. C. tripsacoides, *Br. in Salt Voy. Abyss. App.* 62 (*nomen*). C. uniflorus, *Ehrb. ms. ex Boiss. l.c.*

The PANJAB and UPPER GANGETIC PLAIN, *Royle*, &c. The CONCAN and SCIND, *Stocks.* RAJPOOTANA, *Duthie.* COROMANDEL, *Roxburgh*, &c.—DISTRIB. Beluchistan, Arabia, Africa.

Annual? *Stem* erect, 6–24 in., simple. *Leaves* narrow, glabrous or hairy, mouth of sheath hairy. *Spikes* 2–4 in., solitary, cylindric, green; rachis flexuous,

angular, smooth; involucels loosely imbricate, spines sometimes hooked at the tip, inner $\frac{1}{6}$–$\frac{1}{4}$ in. long, as long as the sessile spikelets.

2. **C. catharticus,** *Delile Cat. Hort. Monsp.* 1838, in *Linnæa* xiii. (1839) *Litterb.* 103; base of involucels turbinate or truncate, inner spines squarrosely spreading subulate dorsally deeply grooved, margins ciliate or scaberulous, outer spreading or reflexed. *Steud. Syn. Gram.* 130; ?*Duthie Grass. N.W. Ind.* 9, *Indig. Fodd. Grass.* t. xi., *Fodd. Grass. N. Ind.* 15; *Boiss. Fl. Orient.* v. 448. C. annularis, *Anderss. in Peters. Reise Mossamb. Bot.* 553. C. echinatus, *A. Rich. Tent. Fl. Abyss.* ii. 389; *Wall. Cat.* n. 8654, A.D. *Aitchis. Cat. Panjab. Pl.* 163; ? *Duthie Grass. N.W. Ind.* 9 (*non Linn.*). C. Lapeta, *Herb. Ham. ex Wall. l.c.* D. C. niloticus, *Fig. & Notar. in Mem. Accad. Torin.* (1854), 380. Elymus Caput Medusæ, *Forsk. Fl. Æg. Arab.* 25 (*non Linn.*).

The Panjab and Upper Gangetic Plain, *Hamilton, Royle,* &c.—Distrib. Arabia, Afric. trop.

Quite glabrous. *Stem* geniculately ascending, branched from the base, leafy. *Leaves* 1–3 in., lanceolate, finely acuminate, scaberulous; sheath inflated. *Spikes* 1–6 in., usually more or less enclosed in the uppermost leaf-sheath; rachis flexuous, smooth; involucels $\frac{1}{4}$–$\frac{1}{3}$ in. across the spreading spines. *Spikelets* $\frac{1}{8}$ in., 1–2-fld.; gl. I membranous; II and III hyaline, ovate, acuminate, 5-nerved; IV ovate-lanceolate, cuspidately acuminate.—Resembles *Pennisetum cenchroides*, but at once recognized by the rigid involucel spines. Duthie's figures under the names of *catharticus* and *montanus* are not recognizable. The widely distributed *C. echinatus*, Linn., is very closely allied, but should be recognized by the broader spines of the involucel. I doubt its being distinct.

16. **STENOTAPHRUM**, *Trin.*

Coarse grasses. *Stem* flattened. *Leaves* distichous. *Spikelets* spicate, partially sunk in one face of a broad flat herbaceous rachis, usually biseriate, ovate, acuminate, 1-fld., dorsally flattened, sometimes on short flat appressed branches of the rachis; rachis simple or jointed, tip acute. *Glumes* 4; I short, broad, rarely 0; II convex, empty; III as long as II, flat, paleate, empty or triandrous; IV equalling III, coriaceous, bisexual; palea large, ovate, acute, coriaceous. *Anthers* linear. *Styles* free. *Grain* broad, flattened, free within the hardened glume and pale.—Species 2 or 3 tropical.

1. **S. glabrum,** *Trin. Fund. Agrost.* 176, *Gram. Panic.* 60; gl. I very short truncate membranous nerveless. *Nees Agrost. Bras.* 92; *Doell in Mart. Fl. Bras.* ii. II. 301, t. 39. S. americanum, *Schrank Pl. Rar. Hort. Monac.* 98, t. 98, *in Flora,* vii. (1824) *Beib.* 27, 28; *Kunth Enum. Pl.* i. 138; *Benth. Fl Austral.* vii. 501; *Griseb. Fl. Brit. W. Ind.* 544. S. complanatum, *Schrank in Flora l. c.* 26; *Kunth Enum. l.c.* 137; *Nees l.c.* 93; *Thwaites Enum. Pl. Zeyl.* 361; *Trim. Cat. Ceyl. Pl.* 106; *Baker Fl. Maurit.* 440. S. dimidiatum, *Brong. Bot. Voy. Coq.* 127; *Wight Cat.* n. 1606. S. glabrum, *Trin. l.c.* 175; *Nees l.c.* S. Koenigii, *Schrank l.c.* S. madagascariense, *Kunth Revis. Gram.* ii. 163, t. 211; *Enum. Pl.* i. 524, *Suppl.* 99; *Steud. l.c.* 118. S. sarmentosum, *Nees in Mart. Fl. Bras.* ii. 93; *Fl. Afr. Austr.* 63. S. Swartzianum, *Nees Fl. Afr Austr.* 62. Rottboellia complanata, *Sw. in Ges. Fr. Naturf. Berl. Mag.* iv. (1810) 89, t. 5; *Schrank l.c.* R. compressa, *Beauv. Agrost.* 109, t. 21, f. 8.

R. dimidiata, *Thunb. Prodr. Fl. Cap.* 23. R. paleacea, *Steud. ex Doell in Mart. Fl. Bras.* ii. II. 301. R. tripsacoides, *Lamk. Illustr.* i. 205, t. 48, f. 1. Panicum dimidiatum, *Linn. Syst. Ed.* xiii. 90; *Willd. Sp. Pl.* i. 339; *Retz. Obs.* vi.; *Roxb. Fl. Ind.* i. 287. P. poæforme, *Bojer Hort. Maurit.* 365. Diastemanthe platystachys, *Steud. l. c.* 360. Ischæmum secundatum, *Walt. Fl. Carol.* 249.—Stenotaphrum, *Wall. Cat.* 8673.

PLAINS throughout INDIA.—DISTRIB. Tropics generally.

Stem stout, creeping below; branches 2 in. to 2 ft. high. *Leaves* 3–6 in. by $\frac{1}{3}$ in. broad or less; sheath broad, flat; ligule a ring of fine hairs. *Spike* erect, 2–4 by $\frac{1}{8}$–$\frac{1}{4}$ in., not or obscurely jointed; branches when present $\frac{3}{4}$ in. by $\frac{1}{6}$ in., erect. *Spikelets* $\frac{1}{6}$ in. long; gl. I about $\frac{1}{6}$ II, orbicular; II thin, ovate, acuminate, 7-nerved; III lanceolate, acuminate, margins thickened obscurely incurved.—Very variable in the number and arrangement of the spikelets.

2. **S. Helferi,** *Munro in Cat. Pl. Griff. Falc., &c.* (1865) *ined.*; gl. I half as long as III ovate-oblong strongly 3–5-nerved.—Panicum dimidiatum, *Heyne in Herb. Rottl.*

TENASSERIM, *Helfer.* MALAY PENINSULA; Plus river, *Wray;* Quedah, *King's Collector*; "Hengeiturei, Feb. 12th, 1796," *Heyne? in Herb. Rottler.*—DISTRIB. Tonkin.

Stem 1–2 ft., as thick as a crow-quill or thicker, base decumbent geniculate. *Leaves* 6–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., strap-shaped, upper acuminate, lower obtuse apiculate; sheath broad, flat; ligule a ring of short hairs. *Rachis* of spikes 3–6 by $\frac{1}{4}$–$\frac{2}{3}$ in., straight or flexuous, not jointed; spikes $\frac{1}{4}$–$\frac{1}{2}$ in.; spikelets 3–6, imbricate, $\frac{1}{6}$–$\frac{1}{5}$ in. long, ovate, acute; gl. I obtuse; II lanceolate, thin, 7-nerved; III = II, 5-nerved, paleate, male; IV chartaceous, dorsally flattened ovate, beaked, smooth.—Heyne's specimen is probably from the Malay Peninsula, from whence he received plants; it is accompanied by one of *S. glabrum.*

17. THUAREA, *Pers.*

A small much-branched prostrate leafy littoral grass. *Leaves* short, flat. *Spike* terminal, included in a leaf-sheath; rachis flat, herbaceous, base at length accrescent and enveloping the spike. *Spikelets* uniseriate, jointed on one face of the rachis, 4–6 upper male, 2-fld.; 1–2 lower fem. or bisexual. *Glumes* 3–4; I small, hyaline, or in males 0; II empty; III and IV subequal, triandrous in the males; IV of the lower spikelets rigid, thin, bisexual, paleate. *Anthers* linear. *Styles* distinct. *Grain* free within the glume, but with the rest of the spikelets closely enveloped by the thick hardened base of the rachis, which forms an obconic caducous nut with a free deflexed and incurved beak.

T. sarmentosa, *Pers. Syn.* i. 110; *Kunth Revis. Gram.* i. 247, t. 35, *Enum. Pl.* i. 174, *Suppl.* 128; *Beauv. Agrost.* 127, t. 22, f. 9; *Steud. Syn. Gram.* 112; *Thw. Enum. Pl. Zeyl.* 363; *Trim. Cat. Pl. Ceyl.* 106; *Benth. Fl. Hongk.* 415, *Fl. Austral.* vii. 502. T. latifolia and media, *Br. Prodr.* 197; *Kunth Enum. l. c.* 173, 174. T. involuta, *Br. l. c.; Miq. Fl. Ind. Bat.* iii. 473. Ornithocephalochloa arenicola, *Kurz in Trim. Journ. Bot.* iv. (1875) 332, t. 171. Ischæmum involutum, *Forst. Prodr.* 73.

CEYLON, the LACCADIVE and NICOBAR ISLDS.—DISTRIB. Malay Islds., Madagascar, Australia, Polynesia.

Leaves 1–2 in., linear-oblong, acute, glabrous or silky; sheaths broad, silky; ligule of hairs. *Spikes* $\frac{1}{2}$–1 in. *Spikelets* $\frac{1}{8}$ in. *Glumes* obtuse, ciliate, I minute; II ovate-oblong, 5-nerved; III much broader, 5-nerved; IV oblong-lanceolate, tip

ciliate. *Fruit* ⅓ in. long and broad, trigonously obconic or turbinate, obscurely ribbed, with a deep depression on one side of the crown.

Tribe II. Oryzeæ. (See p. 3.)

18. **ORYZA,** *Linn.*

Leafy tall grasses. *Leaves* long, flat. *Spikelets* jointed on the slender branches of an elongate rarely spiciform panicle, 1-fld., oblong, laterally compressed, pedicels annular at the top. *Glumes* 2–3, I and II much the smallest, empty, scale or bristle-like, rarely 0; III chartaceous, obtuse acute or awned, strongly 3–5-nerved; palea as long as the gl., keeled. *Lodicules* 2, 2-lobed, rarely entire. *Stamens* 6, anthers linear. *Styles* short, free; stigmas laterally exserted. *Grain* narrow, free or adnate to the gl. and palea.—Species 5–6, tropical.

The gl. IV of most authors, is here considered to be a palea, as is indicated by the positions of the lodicules and stamens in relation to it.

1. **O. sativa,** *Linn. Sp. Pl.* 333; ligule long 2-partite, spikelets loosely panicled ⅓–½ in. long, gl. I and II ¼–⅓ the length of III lanceolate, III hispid above dorsally spinescently ciliate, awn very long. *Gærtn. Fruct.* ii. 5, t. 80, f. 5; *Host Gram. Austr.* iv. t. 325; *Lamk. Encycl.* t. 264; *Kunth Enum. Pl.* i. 7, *Suppl.* 4; *T. Nees Gen. Fl. Germ. Monocot.* i. 2; *Steud. Syn. Gram.* 3; *Roxb. Fl. Ind.* ii. 200; *Wall. Cat.* n. 8632; *Griff. Notul.* iii. 5, *Ic. Pl. Asiat.* t. 139, f. 149; *Dalz. & Gibs. Bomb. Fl. Suppl.* 98; *Duthie Grass. N.W. Ind.* 12, *Field & Gard. Crops,* 15, t. 4, *Fodd. Grass. N. Ind.* 20; *Miq. Fl. Ind. Bat.* iii. 368; *Doell in Mart. Fl. Bras.* ii. II. 7, t. 1; *Benth. Fl. Austral.* vii. 550. O. fatua, *Koen. ex Trin. in Mem. Acad. Petersb. Ser.* 6, ii. II. (1839) 177. O. rufipogon, *Griff. l.l. c.c.* & t. 145, f. 2, & t. 139, f. 147. O. palustris, *Salisb. Prodr.* 25. O. repens & palustris, *Herb. Ham. ex Wall. l. c.* F. *ex Steud. l. c.* O. segetalis, *Russ. ex Wall. l. c.* B. O. sorghoides, *Steud. l. c.*

Indigenous in marshes of Rajpootana, Sikkim, Bengal, the Khasia Hills, Central India, The Circars and Pegu. Ceylon, *Ferguson.*—Distrib. Austral. trop.

Annual. *Stems* 2–10 ft., creeping or floating. *Leaves* 1–2 ft. by ¼–⅓ in. or more, flat, striated, 1-nerved, scaberulous; sheaths smooth. *Panicle* at length drooping. *Spikelets* not imbricating, awn 3–5 in. long, yellow or reddish, shining.—I have described above the plant which Roxburgh and other Indian authors consider to be the indigenous Rice, and who have collected it as such in the localities mentioned above, as I have in hot valleys of Sikkim and the Khasia Hills. It resembles in all essentials a commonly cultivated awned sort. I have seen no specimens of Griffith's *O. rufipogon,* which he describes as a very different-looking plant, but his characters are not diagnostic, and a memorandum by Munro (in Herb. Kew) states that he can find no real distinction for it. For the cultivated varieties of Rice in India, see Watt. "Dictionary of the Economic Products of India," vol. v. —The awnless O. denudata, *Steud. Nom. Ed.* I. 577 (O. mutica, *Steud. l. c.; Lour. Fl. Cochinch.* i. 267, O. sativa, *var.* submutica, *Miq. Fl. Ind. Bat.* iii. 369), is a cultivated form.

2. **O. latifolia,** *Desv. Journ. Bot.* i. (1813) 77; ligule very short, branches of panicle very long often whorled, spikelets subimbricate oblong beaked, gl. I and II = ¼–⅓ III lanceolate, III hispid finely granulate awn

as long or twice as long as the gl. *Kunth Revis. Gram.* i. 185, t. 4, *Enum. Pl.* i. 7, *Suppl.* 4. O. officinalis, *Wall.* & montana, *Ham. Wall. Cat.* n. 8635, 8633. O. platyphylla, *Sch. f. Syst.* vii. II. 1364.

Low valleys in SIKKIM, ASSAM, SILHET, CACHAR, MUNNEPORE, CENTRAL INDIA, and BURMA.—DISTRIB. Trop. As. Afr. and Amer.

Stems up to 6 ft., tufted, as thick as a swan's quill below. *Leaves* 1–2 ft. by ½–1½ in., nearly smooth, many-nerved; midrib slender, shining beneath; sheath very long. Branches of *panicle* 4–8 in., very slender; pedicels and branchlets bearded at the base. *Spikelets* ⅛–¼ in.; gl. III and palea hairy.

Var. *collina*; gl. I and II minute or 0. O. sativa, *Thwaites Enum. Pl. Zeyl.* 357. O. sativa *var.* collina, *Trim. mss.*—Ceylon; hills about Colombo and in the Western Provinces.

3. **O. granulata,** *Nees et Arn. in Wight Cat.* n. 2354, *ex Wall. Cat.* n. 8634; ligule very short, spikelets in simple racemes obtuse awnless; gl. I and II minute or 0, III and palea glabrous granulate. *Steud. Syn. Gram.* 3. O. filiformis, *Herb. Ham. ex Wall. l. c.* O. triandra, *Herb. Heyne ex Steud. l. c.* Padia Meyeriana, *Zoll. & Mor. Verz.* 103; *Miq. Fl. Ind. Bat.* iii. 373; *Steud. l. c.* 3.

In dry woods; SIKKIM HIMALAYA, the KHASIA, and BEHAR HILLS. MALABAR and MADURA, *Heyne, Wight,* &c. CEYLON; at Rambukkana, *Trimen.*—DISTRIB. Java.

Stems 2–3 ft., slender, tufted. *Leaves* 3–6 by ½ in., thin, midrib beneath and nerves distinct; sheath very long. *Racemes* very slender, on very long slender peduncles; rachis flexuous, rarely with a short branch at the base. *Spikelets* shortly pedicelled, ⅛–¼ in. long.

4. **O. Ridleyi,** *Hook. f.*; very slender, leaves thin nerves distinct, ligule long, panicle with solitary alternate branches, spikelets ⅓–½ in., gls. I and II setaceous, III thinly chartaceous scabrid narrowly oblong dorsally spinulose-ciliate narrowed into an awn of about its own length.

MALAY PENINSULA; Pahang, in dense thickets, *Ridley.*—DISTRIB. Borneo.

Stem 2–3 ft., weak, as thick as a crow's quill below. *Leaves* 12 by ¾ in., nearly smooth; sheath long, slender. *Panicle* 12 in.; branches sometimes 6 in. and rachis very slender; pedicels 1/10–½ in.—Habit of *O. granulata,* but spikelets more like *O. coarctata.*

5. **O. coarctata,** *Roxb. Fl. Ind.* ii. 206; tall, stout, leaves coriaceous caudate-acuminate spinulose-serrate nerves obscure, ligule very short, panicle spiciform, branches few-fld., spikelets ½–⅔ in., gl. I and II setaceous, III narrowly dolabriform quite smooth dorsally winged tip narrowed into a short rigid awn quite smooth. *Wall. Cat.* n. 8646; *Griff. Notul.* iii. 8, *Ic. Pl. Asiat.* t. 142, f. 1; *Miq. Fl. Ind. Bat.* iii. 371. O. triticoides, *Griff. Notul. l. c.* Sclerophyllum coarctatum, *Griff. l. c.*

SUNDERBUNDS, *Hamilton, Roxburgh,* &c. SCIND, at Shikarpur (*Herb. Duthie*).

Stem 4–6 ft., erect from a stout creeping rhizome, branching, smooth, hard, polished. *Leaves* 6–12 by ⅓–½ in., unequal-sided, rigid, smooth or scaberulous, nerves and midrib obscure, tips long slender; sheath long, undulately reticulate, polished. *Panicle* 4–6 in., rachis and branches trigonous, stiff, quite smooth; pedicels clavate at the top and then contracted below the dilated cupular tip. *Spikelets* laxly imbricate, rigidly chartaceous; gl. I and II not half as long as III, erect; III strongly laterally often obliquely compressed, keeled, keel dilated above into a rounded wing, obscurely 7–9-nerved, lateral nerves submarginal; palea chartaceous, as long as the gl., oblong-lanceolate, acuminate, plicate, 5-nerved, median

nerve faint, two intermediate very stout, lateral more slender. *Lodicules* large, membranous, subquadrate or trapeziform. *Anthers* very long and slender. *Ovary* narrow, elongate. *Grain* not seen.—A very remarkable species. In Gen. Plant (iii. 1117) this is by oversight stated to be Himalayan.

19. **LEERSIA,** *Sw.*

Characters of *Orzya*, but empty gls. 0; fl. gls. thinner not awned, keel and margin ciliate; stamens 6, 3 or fewer.—Species 7, chiefly American.

1. **L. hexandra,** *Sw. Prodr. Veg. Ind. Occ.* 21, *Fl. Ind. Occ.* i. 131; panicle contracted, stamens 6. *Fl. Dan.* t. 1744; *Kunth Enum. Pl.* i. 6; *Host Gram. Austr.* t. 35; *Engl. Bot.* t. 2908; *Reichb. Ic. Fl. Germ.* i. t. 52; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 1; *Wall. Cat.* n. 8637; *Thw. Enum.* 356; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 12; *Miq. Fl. Ind. Bat.* iii. 367; *Benth. Fl. Austral.* vii. 549. L. australis, *Br. Prodr.* 210; *Kunth l. c.* 6. L. ciliata, *Roxb. Fl. Ind.* ii. 207; *Aitchis. Cat. Panjab. Pl.* 157; *Duthie l. c., Fodd. Grass. N. Ind.* 21. L. ciliaris, *Griff. Notul.* iii. 2. L. glaberrima, *Trin. Oryz.* 7; *Miquel l. c.* 368. L. mexicana, *H. B. & K. Nov. Gen. & Sp.* i. 195; *Kunth l. c.* 6, & ii. 2, *Suppl.* 2; *Revis. Gram.* 178, t. 1. Zizania ciliata, *Spreng. Syst.* ii. 136; *Kunth Revis. Gram.* i. 8; *Griff. Notul.* iii. 1. Oryza ciliata, *Herb. Ham. ex Wall. Cat.* n. 8637 B. O. hexandra, *Doell in Mart. Fl. Bras.* ii. II, 10. Pharus ciliatus, *Retz. Obs.* v. 23. Pseudoryza ciliata, *Griff. Ic. Pl. Asiat.* t. 144, f. 1. Turraya napalensis, *Wall. Cat.* 8637 D. Blepharochloa ciliata, *Endl. Gen.* 1352; *Steud. l. c.* 4.

Lower Himalaya; in marshes, from Nepal eastward to Assam and Burma, and southward to the Malay Peninsula and Ceylon.—Distrib. Trop. Afric., Amer., and Austral.

Stem 2–4 ft., weak, base rooting; nodes villous. *Leaves* erect, 8–12 in. by $\frac{1}{3}$–$\frac{1}{2}$ in., flat; ligule truncate. *Panicle* 2–4 in., oblong, branches suberect or spreading flexuous, few-fld. *Spikelets* $\frac{1}{6}$ in., dimidiate-oblong, smooth or scaberulous, pale green; keel of gl. and palea rigidly ciliate.

2. **L. oryzoides,** *Sw. Prodr. Veg. Ind. Occ.* 21, *Fl. Ind. Occ.* i. 132; panicle effuse, stamens 3. *Host Gram. Austr.* i. t. 35; *Kunth Enum. Pl.* i. 5, *Suppl.* 1; *Reichb. Ic. Fl. Germ.* i. t. 52. Oryza clandestina, *A. Br. ex Aschers. Fl. Brandenb.* 799. Asprella oryzoides, *Lamk. Ill.* i. 167; *Roem. & Sch. Syst.* ii. 266. Homalocenchrus oryzoides, *Mieg. ex Poll. Hist. Pl. Palat.* i. 52. Phalaris oryzoides, *Linn. Sp. Pl.* 55 (*excl. cit.*); *Schreb. Beschr. Græse,* vi. t. 22.

Kashmir, *Falconer, Thomson.*—Distrib. Trop. and temp. regions.

Stem 2–3 ft., nodes villous. *Leaves* glaucous, scaberulous; sheath compressed; ligule lacerate. *Panicle* 3–7 in., base embraced by the upper leaf-sheath. *Spikelets* few, remote, $\frac{1}{6}$ in. long.

20. **HYGRORHIZA,** *Nees.*

A floating glabrous grass. *Leaves* short, broad, flat. *Spikelets* few, lanceolate, 1-fld., shortly pedicelled on the few branches of a broad spreading panicle, articulate on the annulate tip of the pedicel. *Glume* solitary (empty gls. 0), fig. membranous, lanceolate, narrowed into a long awn, 5 nerved, keel and nerves ciliate; palea acuminate, 3-nerved, keel scabrid. *Lodicules* 2, gibbous. *Stamens* 6, anthers very long. *Styles* short, free, stigmas

laterally exserted. *Grain* narrowly oblong, free within the membranous glumes.

H. aristata, *Nees in Edinb. New Phil. Journ.* xv. (1833) 380; *Steud. Syn. Gram.* 5; *Thw. Enum. Pl. Zeyl.* 356; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 12, *Fodd. Grass.* N. *Ind.* 20; *Aitchison Cat. Panjab Pl.* 157; *Wall. Cat.* n. 8638; *Wight Cat.* n. 1739. Leersia aristata, *Roxb. Fl. Ind.* ii. 207; *Griff. Notul.* iii. 3; *Steud. l. c.* Pharus aristatus, *Retz. Obs.* v. 23. P. natans, *Herb. Russel, ex Wall. l. c.* Zizania aristata, *Kunth Revis. Gram.* i. 8, *Enum. Pl.* i. 10. Z. Retzii, *Spreng. Syst.* ii. 136. Potamochloa Retzii, *Griff. Notul.* iii. 3, 8, *Ic. Pl. Asiat.* t. 139, f. 147, & t. 140.—*Rheede Hort. Mal.* x. t. 12.

UPPER and LOWER GANGETIC PLAINS, ASSAM, CHITTAGONG, PEGU, the DECCAN and CEYLON.—DISTRIB. Tonkin.

Stem as thick as a crow-quill, 12–18 in. long, with feathery whorled roots at the nodes. *Leaves* 1–3 by ½–⅔ in., ovate-lanceolate to linear-oblong, scaberulous above; base and tip rounded, or tip acute and base cordate; sheath broad, inflated, compressed, mouth auricled; ligule 0. *Panicle* 2–3 in. long, and broad triangular, branches few, spreading, slender, lower whorled, often deflexed. *Spikelets* ⅛ in. long, pale green, pedicels articulate with a red annulus below the middle. *Glume* dorsally convex; palea as long, awn longer than the gl.

21. LEPTASPIS, *Br.*

Tall monœcious grasses. *Leaves* petioled, elliptic-oblong, flat, nervules trabeculate. *Panicle* terminal, erect; branches whorled, long, stiff, bearing a raceme of spikelets at their tips, of which the upper are male. *Spikelets* not jointed on the very short pedicels. MALE, glumes 3, I and II small, ovate, empty, 5–7-nerved, spreading; III paleate, hexandrous; filaments short, anthers long. FEM. a utricle open at the top, enclosing the ovary and a linear palea, the tip of which is exserted. *Lodicules* small, truncate. *Styles* 3, very long. *Grain* free within the inflated accrescent utricle.—Species 3 or 4, tropical Asia, Africa, and Australia.

1. **L. urceolata,** *Br. in Benn. Pl. Jav. Rar.* 23, t. 6; leaves 7–12 in. long-petioled elliptic-lanceolate or oblanceolate, branches of panicle many stout, utricles turbinately pyriform. *Wall. Cat.* n. 8901; *Miq. Fl. Ind. Bat.* iii. 374; *Steud. Syn. Gram.* 8; *Thw. Enum. Pl. Zeyl.* 357; *Trim. Cat. Ceyl. Pl.* 106. L. zeylanica, *Nees ex Steud. l. c.* L. manillensis, *Steud. l. c.* Pharus urceolatus, *Roxb. Fl. Ind.* iii. 611.

PENANG, *Roxburgh.* JOHORE, *King's Collector.* CEYLON, *Thwaites.*—DISTRIB. Java, Sumatra.

Rootstock creeping; stem 2–3 ft. *Leaves* subdistichous, 2–4 in. broad, abruptly acuminate; petiole ½–2 in.; sheath 3–10 in., flattened. *Panicle* 6–12 in. long; lower branches 6–10 in. *Fem. spikelets* ⅛ in. long.

2. **L. cochleata,** *Thw. Enum. Pl. Zeyl.* 357; leaves 4–10 in. shortly petioled oblong-lanceolate, branches of panicle few slender, utricles oblong incurved 5-ribbed tomentose with hooked hairs. *Trim. Cat. Ceyl. Pl.* 106.

CEYLON; in the Central Province, alt. 4000 ft., *Thwaites.*

Stems 2–3 ft. from a procumbent base. *Leaves* 1½–1¾ in. broad, acuminate; petiole ¼–½ in.; sheath 1–3 in. *Panicle* 6–8 in.; branches 3–4 in., ternately whorled. *Fem. spikelets* $\frac{1}{10}$ in.; glumes broadly ovate, acuminate. *Utricle* ¼ in. long. *Grain* not seen.

TRIBE III. ZOYSIEÆ. (See p. 3.)

22. **TRACHYS,** *Pers.*

An annual diffuse softly villous grass. *Spikes* 2- rarely 3-nate, terminal, flattened, rigid, flexuous, jointed. *Spikelets* 1-fld., in alternate subsessile fascicles which are jointed on the under surface of the spikes, and are formed of 1–3 perfect sessile spikelets mixed with squarrose flowerless gls. *Glumes* of perfect spikelets 4, I minute, triangular, coriaceous, nerveless; II narrow, linear-lanceolate, membranous, 3–5-nerved, nerves ciliate below the middle; III much the largest, broadly obovate-oblong, cuspidately acuminate, rigidly coriaceous, 9-nerved epaleate; IV much smaller, ovate-lanceolate, cuspidately acuminate, chartaceous, 1-nerved; palea lanceolate, chartaceous, nerveless. *Lodicules* very minute, hyaline. *Stamens* 3, anthers linear. *Styles* long, free, stigmas long. *Grain* broadly oblong, compressed, free within the gl. and pale.

The above description differs from any that I have met with. Gl. III of the perfect spikelet is much larger than any of those of the imperfect spikelets, which form a squarrose tuft around the perfect.

T. mucronata, *Pers. Syn.* i. 85; *Beauv. Agrost.* 107, t. 21, f. 7; *Kunth Enum. Pl.* i. 168, *Suppl.* 123; *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 106; *Miq. Fl. Ind. Bat.* ii. 472; *Wall. Cat.* n. 8674; *Wight Cat.* n. 1660. T. muricata (*error for* mucronata), *Steud. Syn. Gram.* 112. Cenchrus muricatus, *Linn. Mant.* 302; *Schreb. Beschr. Graes.* ii. 69, t. 34. C. tripsaceus, *Herb. Linn. ex Munro in Journ. Linn. Soc.* vi. (1862) 55. Trachystachys geminata, *A. Dietr. Sp. Pl.* ii. 16. Tripsacum distachyum, *Herb. Linn. ex Munro l. c.* Trachyozus muricata, *Steud. l. c.* 112. Panicum dimidiatum, *Burm. Fl. Ind.* 25, t. 8, f. 3. P. squarrosum, *Retz. Obs.* iv. 15, v. t. 1; *Roxb. Cor. Pl.* iii. 4, t. 206; *Fl. Ind.* i. 288.

The DECCAN PENINSULA; sandy ground near the sea; *Heyne, Roxburgh,* &c. CEYLON; Jaffna, *Gardner.*

Stems 1–2 ft., weak, geniculate, rooting at the nodes. *Leaves* 2–6 by $\frac{1}{4}$–$\frac{1}{2}$ in., linear-lanceolate, acuminate, flaccid, rarely nearly glabrous, margins often crisped; mouth of sheath hairy; ligule obscure. *Peduncle* long or short. *Spikes* 2–3 in., sessile or shortly peduncled, costa of rachis stout, margins broad, green; joints concave subquadrate. *Spikelets* (perfect) $\frac{1}{5}$ in. long, sessile or very shortly stoutly pedicelled, pale, shining, terminal one on the spike solitary; gl. II very much narrower than III, and not overlapping the base of the latter or hardly, epaleate; III nearly flat, with the margins incurved; IV with the palea terete, margins strongly incurved over the palea.—The structure of gl. II is very peculiar; at first sight it may be taken for a narrow membranous palea of III, its lower insertion to which and exterior position are difficult to distinguish.

23. **TRAGUS,** *Haller.*

A low rigid perennial grass. *Leaves* small. *Spikelets* 1-fld., 2–5-nate in narrow spikes, not articulate on the pedicels; rachis slender. *Glumes* 2; I thickly coriaceous, oblong-lanceolate, 5-ribbed, ribs with long recurved spines embracing II which is chartaceous, oblong, apiculate, 1-nerved, scaberulous; palea hyaline, obtuse, involute, faintly 2-nerved below. *Stamens* 3, anthers very long. *Styles* short, distant, stigmas short. *Grain* linear, free within the glumes.

T. racemosus, *Scop. Introd. Hist. Nat.* 73; *Desf. Fl. Atlant.* ii. 386; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 25; *Trimen Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 13, *Indig. Fodd. Grass.* t. 14, *Fodd. Grass. N. Ind.* 22. T. muricatus, *Moench Meth.* 53. T. alienus, biflorus, & Berteronianus, *Schult. Mant.* ii. 205. T. brevicaulis, *Boiss. Diagn. Ser.* I. xiii. 44. T. occidentalis & orientalis, *Nees Agrost. Bras.* 286; *Doell in Mart. Fl. Bras.* ii. II. 286, t. 28. T. Halleri, *Doell l. c.* 122. T. biflorus, *Nees ex Wight Cat.* 1661. Lappago racemosa, *Honck. Syn. Pl. Germ.* i. 440; *Host Gram. Austr.* i. t. 36; *Sibth. Fl. Græc.* ii. t. 101; *Kunth Enum. Pl.* i. 169, *Suppl.* 124; *Steud. Syn. Gram.* 112; *Reichb. Ic. Fl. Germ.* i. t. 30; *Wall. Cat.* n. 8675; *Thw. Enum. Pl. Zeyl.* 362; *Aitchis. Cat. Panjab. Pl.* 163; *Benth. Fl. Austral.* vii. 506; *Miq. Fl. Ind. Bat.* iii. 473. L. biflora, *Roxb. Fl. Ind.* i. 281; *Grah. Cat. Bomb. Pl.* 234. L. aliena, *Spreng. Neue Entdeck.* iii. 15, *Syst. Pl.* i. 266; *Steud. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 295. L. occidentalis, *Nees in Schimp. Pl. Arab. Fel. Ed.* ii. n. 793. Cenchrus racemosus, *Linn. Sp. Pl.* 1049; *Schreb. Beschr. Graes.* 45, t. 4. C. linearis, *Lam. Fl. Franc.* iii. 631. C. muricatus, *Herb. Russ. ex Wall. l. c.* A. Phalaris muricata, *Forsk. Fl. Æg. Arab.* 302. Aira malatrina, *Herb. Ham. ex Wall. l. c.* D.

Dry plains of INDIA; from Kashmir to Upper Bengal, and southward to CEYLON. BURMA, *Wallich.*—DISTRIB. Warm regions generally.

Stems erect in the first year, 4–8 in. high, leafy nearly to the spikes, then sending from the base rooting and leafing flg. stolons all round. *Leaves* very variable, smooth or scaberulous, ovate and ¼ in. long, or narrower and 1–1½ in. long, acuminate, margins and mouth of sheath ciliate. *Spikes* 1–4 in., rachis and very short pedicels pubescent. *Spikelets* ⅛–⅙ in., crowded, in pairs face to face, simulating one spikelet with 2 equal spinous glumes. Gl. II with broad hyaline margins towards the tip.—In all Indian specimens I find the spikelets in pairs, each with 2 gl. I have not seen the fascicled spikelets described in Gen. Plant. A small lower gl. is described as sometimes present, and 5 spikelets as occurring on a single pedicel.

24. LATIPES, *Kunth.*

A perennial rather rigid grass. *Leaves* subulate, convolute. *Spikelets* 1-fld., in simple subspiciform racemes, biseriate (one usually imperfect) persistent on the flattened truncate spreading articulate pedicels; rachis flexuous. *Glumes* 3, I and II empty, thickly coriaceous, I usually longest, narrow, recurved, 3-nerved, subspinously pectinate, dorsally smooth; II lanceolate, spinously tubercled, embracing III (flg.), which is shorter, hyaline, oblong, acute, ciliate; palea minute, linear-oblong, nerveless. *Lodicules* 2, hyaline. *Stamens* 3, anthers oblong. *Styles* free. *Grain* free, obliquely ovate-lanceolate.

L. senegalensis, *Kunth Revis. Gram.* i. 261, t. 42, *Enum. Pl.* i. 171, *Suppl.* 125; *Duthie Grass. N.W. Ind.* 13, *Fodd. Grass. N. Ind.* 22. Lappago Latipes, *Steud. Syn. Gram.* 112. T. senegalensis, *J. Gay ex Kunth Enum. l. c.*

SCIND, at Kurrachee, *Stocks.* BELUCHISTAN, *Frere.*—DISTRIB. Arabia, Abyssinia, Senegal.

Stems 3–10 in. wiry, creeping with many erect or spreading branches, leafy up to the racemes. *Leaves* 1–3 in.; lower sheaths short, mouth hairy; ligule 0. *Racemes* 2–6 in.; rachis glabrous; pedicels distant, narrowly cuneiform, margins winged ciliate. *Spikelets* ⅙–⅕ in., reddish-brown.—The Indian specimens are small. The pedicels are flattened and bear normally 2 spikelets, one well developed and fertile, the other imperfect with gl. I and II narrower of equal length and irregularly spinously tubercled.

25. **LOPHOLEPIS**, *Decne.*

An annual tufted erect grass. *Leaves* short, flat. *Spikelets* minute, 1-fld., jointed but persistent on the very short spreading pedicels of an elongate simple spiciform raceme, exactly like a bird's head; pedicels jointed on the rachis. *Glumes* 3; I incumbent, oblong, acute, strongly incurved above the base, produced above into a globose boss with a pectinate crest, and with a pectinate wing on the mesial line beyond it; II shorter, narrower, with often a dorsal pectinate wing; III flg. much shorter, hyaline, ovate, acute; palea hyaline. *Lodicules* quadrate. *Stamens* 2; anthers short, most minute. *Styles* short; stigmas feathery. *Grain* subulate, base gibbously incurved, free within the rigid glumes.

L. ornithocephala, *Steud. Syn. Gram.* 112; *Decne in Archiv. Mus. Par.* i. (1839) 147; *Wall. Cat.* n. 8881. Holboellia ornithocephala, *Wall. in Hook. Bot. Misc.* ii. 144, t. 76; *Wight Cat.* n. 1741; *Kunth Enum. Pl.* i. 171.

Southern Provinces of the DECCAN PENINSULA, Madura, Tinnevelly, &c., *Koenig*, &c. CEYLON; Northern Province, *Trimen.*

A rather stiff grass, 6–18 in. high; roots wiry. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., ovate to oblong-lanceolate, acuminate, margins ciliolate; lower sheaths short; ligule 0. *Racemes* 2–4 in., columnar, $\frac{1}{3}$ in. diam.; rachis slender, strict, and the horizontal rather stout grooved pedicels green and scabridly ciliate. *Spikelets* $\frac{1}{16}$–$\frac{1}{12}$ in. long, red-brown in age, horizontal or slightly deflexed from the pedicel.—One of the most singular Indian grasses.

26. **PEROTIS**, *Ait.*

A slender grass, with short broad leaves and a crinite spike. *Spikelets* subsessile, 1-fld., jointed on a slender simple unjointed rachis, very narrow, callus conical. *Glumes* 3; I and II empty, subequal, narrowly linear, 1-nerved, tapering into long capillary awns; III very minute, flg.; palea hyaline. *Lodicules* short, hyaline. *Stamens* 3, anthers very short. *Styles* very short, united at the base, stigmas very short. *Grain* much longer than its glumes, narrow.

P. latifolia. *Ait. Hort. Kew*, i. 85; *Beauv. Agrost.* t. 4, f. 9; 6 (laxifolia), *Kunth Revis. Gram.* i. 357, t. 92, *Enum. Pl.* i. 471, *Suppl.* 380; *Steud. Syn. Gram.* 186; *Roxb. Fl. Ind.* i. 239; *Wall. Cat.* n. 3783; *Wight Cat.* n. 1740; *Grah. Cat. Bomb. Pl.* 237; *Dalz. & Gibs. Bomb. Fl.* 296; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 13; *Benth. Fl. Hongk.* 418; *Miq. Fl. Ind. Bat.* iii. 479. P. Burmanni, *Steud. Nom. Ed.* I. 605. P. cubana, *Wright in Sauv. Fl. Cub.* 202. P. glabrata, *Steud. Syn. Gram.* 186. P. hordeiformis, *Nees ex Steud. Nom. Ed.* II. ii. 306; *Syn. Gram. l. c.*; *Trin. in Mem. Acad. Petersb. Ser.* VI. vi. II. (1845) 267. P. longiflora, *Nees in Hook. & Arn. Bot. Beech. Voy.* 247; *Steud. Syn. Gram.* 186. P. patula, *Nees ex Steud. Nom. l c.*; *Trin. Fund. Agrost.* ii. 266; *Steud. Syn. Gram.* 186. P. rara, *Br. Prodr.* 172; *Benth. Fl. Austral.* vii. 509. P. scabra, *Willd. ex Trin. Diss.* ii. 172. P. spicæformis, *Beauv. ex Steud. Nom. Ed.* I. 605. Perostis laxifolia, *Beauv. l. c.* 6. Saccharum spicatum, *Linn. Sp. Pl.* 54. S. brevifolium, *Herb. Ham. ex Wall. l. c.* B. Agrostis spicæformis, *Linn. f., Suppl.* 108; *Willd. Sp. Pl.* i. 362. Anthoxanthum indicum, *Linn. Sp. Pl.* 28. Xystidium barbatum, *Presl Rel. Hænk.* i. 228. X maritimum, *Trin. Fund. Agrost.* 102, t. 2.—*Rheede Hort. Mal.* xii. t. 62.

Lower Himalaya, ascending to 5000 ft., from Kunawur to Sikkim. Plains of India from the Panjab to Burma and the Malay Peninsula and southwards to Ceylon.—Distrib. Affghan., Trop. Asia, and Africa.

Stems stout and branching at the base, then ascending, 3–10 in., leafy. *Leaves* ½–1 in., ovate or lanceolate, base cordate; sheath short; ligule ciliate. *Spikes* 1–8 in. *Spikelets* $\frac{1}{10}$–$\frac{1}{6}$ in., contracted into a callus above the joint. *Glumes* scaberulous; awn very variable in length.—Bentham is, I think, right in his suggestion that *P. rara*, Br., is not different from *P. latifolia*, and that there is but one species of *Perotis*, varying greatly in the size of all its parts.

27. **ZOYSIA**, *Willd.*

A small, much branched, rigid, glabrous grass. *Leaves* subulate, pungent. *Spikelets* small, ovoid, 1-fld., spicate, subimbricate, jointed on and appressed to a rigid notched unjointed rachis, sessile or shortly pedicelled. *Glumes* 2; I empty, coriaceous, laterally compressed, shining, nerveless, margins connate below, hyaline; II much smaller, membranous, linear-oblong, obtuse, complicate; palea short, nerveless, hyaline or 0. *Lodicules* 0. *Stamens* 3, anthers long. *Styles* very long, distinct, stigmas elongate. *Grain* free within the glumes.

Z. pungens, *Willd. in Ges. Naturf. Fr. N. Schr.* iii. (1801) 441; *Br. Prodr.* x. 208; *Kunth Enum. Pl.* i. 471, *Suppl.* 381; *Beauv. Agrost.* i. t. 4, f. 1; *Steud. Syn. Gram.* 414; *Wall. Cat.* n. 3763; *Wight Cat.* n. 1728; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 106; *Miq. Fl. Ind. Bat.* iii. 478; *Hook. f. Fl. New Zeal.* i. 312; *Benth. Fl. Austral.* vii. 506; *Buchanan Grasses, N. Zeal.* t. 13 A.; *Baker Fl. Maurit.* 442. Z. aristata, Brownii, Griffithiana, & sedoides, *C. Muell. in Bot. Zeit.* xiii. (1855) 272, 273, 274. Z. japonica, *Wendl. ex Steud. l. c.* 414. Z. sinica, *Hance in Journ. Bot.* vii. (1869) 168, *& in Journ. Linn. Soc.* xiii. (1873) 134. Z. setacea, *Nees ex Steud. Nom. Ed.* II. ii. 801. Z. tenuifolia, *Trin. in Mem. Acad. Petersb. Ser.* VI. iv. *Sc. Nat.* ii. (1836) 96. Matrella juncea, *Pers. Syn.* i. 78. Panicum Crinum-ursi, *Boy ex Steud. Nom. l. c.* 255. Milium maritimum, *Koen. ex Wall. l. c.* Ophiurus erectus, *Herb. Wight. ex Wall. l. c.* B. Agrostis Matrella, *Linn. Mant.* ii. 185; *Roxb. Fl. Ind.* i. 317.

Sandy shores of India, Malacca, and Ceylon.—Distrib. Trop. Asia, Austral., and Maurit.

Rootstock rigid, wiry; branches interlaced and rooting, sending up short leafy stems, 6–10 in. high. *Leaves* 1–3 in., coriaceous, usually spreading, margins incurved; sheath short, mouth ciliate. *Spikes* 1–1½ in. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in.

Tribe IV. Andropogoneæ. (See p. 3.)

28. **COIX,** *Linn.*

A tall annual or perennial grass. *Leaves* long, broad. *Spikes* numerous, axillary and terminal; lower spikelets solitary, fem., enclosed in an at length hardened polished nut-like bract, through the apex of which the pedicelled male portion protrudes. *Male spikelets* 2–3-nate at each node of the rachis, one sessile and one or two pedicelled, lanceolate; glumes 4, I and II subequal, empty, rigid, or herbaceous; I keeled along the inflexed margins; III and IV hyaline, paleate, triandrous or empty. *Fem. spikelets* ovoid, acuminate; glumes 4, I chartaceous; II–IV successively

thinner; IV paleate. *Staminodes* minute. *Lodicules* 0. *Ovary* ovoid, styles 2, free slender. *Grain* orbicular, ventrally furrowed, enclosed in the hardened globose ovoid or cylindric involucre.

C. Lachryma-Jobi, *Linn. Sp. Pl.* 972; C. Lachryma, *Linn. Syst. Ed.* x. 1261; *Lamk. Ill.* t. 750; *Kunth Enum. Pl.* i. 20, *Suppl.* 16, t. 3, 4; *Beauv. Agrost.* t. 24, f. 5; *Bot. Mag.* t. 2479; *Steud. Syn. Gram.* 9; *Webb. Phyt. Canar.* t. 242, 243; *Roxb. Fl. Ind.* iii. 568; *Grah. Cat. Bomb. Pl.* 240; *Wall. Cat.* n. 8623; *Griff. Notul.* iii. 10; *Thw. Enum. Pl. Zeyl.* 375; *Trimen Cat. Ceyl. Pl.* 106; *Dalz. & Gibs. Bomb. Fl.* 289; *Aitchis. Cat. Panjab. Pl.* 157; *Duthie Grass. N.W. Ind.* 11, *Fodd. Grass. N. Ind.* 18; *Miq. Fl. Ind. Bat.* iii. 476, t. 41 B. C. agrestis, *Lour. Fl. Cochinch.* 551. C. arundinacea, *Lamk. Encycl.* iii. 422. C. exaltata, *Jacq. Eclog. Gram.* 6, t. 40. C. ovata, *Stokes Bot. Mat. Med.* iv. 342. C. pendula, *Salisb. Prodr.* 28. C. puellarum, *Balans. in Journ. de Bot.* iv. (Paris, 1890), 77. C. stigmatosa, *Koch & Bouchè, Ind. Sem. Hort. Berol.* (1855) 9. Lithagrostis Lacryma-Jobi, *Gærtn. Fruct.* i. 7, t. i. f. 10.

Throughout the hotter and damper parts of INDIA, wild or cultivated (not wild in Ceylon).—DISTRIB. Trop. Asia, cult. in Africa and America.

Stem 3–5 ft., stout, leafy, rooting at the lower nodes. *Leaves* 4–18 by 1–2 in., wavy, base cordate; sheaths smooth; ligule very short, glabrous. *Spikes* 2–3 in., suberect, peduncled; male spikelets 3, or 2 with an imperfect one, ⅓ in. long; gl. I narrowly winged. *Fruit* ovoid or spherical, ¼–⅓ in. long, osseous, bluish gray.

VAR. *gigantea*, Stapf mss.; perennial, attaining 15 ft. high, leaves narrower more strict, male spikelets 3-nate at the internodes, often forming long cylindric drooping spikes, gl. I broadly winged, fruit as in the type. C. gigantea, *Roxb. Fl. Ind.* iii. 569; *Wall. Cat.* n. 8624, 8625. *Aitch. Cat. Panjab. Pl.* 157; *Duthie Grass. N.W. Ind.* 11; *Fodd. Grass. N. Ind.* 18. C. lingulata, *Hack. in Œstr. Bot. Zeitschr.* (1891) 5.—*Rheede Hort. Mal.* xii. t. 70.—Hot valleys from the N.W. Provinces to Assam and southwards to the Malay Peninsula and Travancore.—Affghanistan.

VAR. *stenocarpa*, Stapf mss.; fruit subcylindric ¼–⅔ in. long white osseous. C. stenocarpa, *Balams. l. c.* C. tubulosa, *Hack. in Engl. Bot. Jahrb.* iii. 260?—Upper Assam, *Bruce.* Mergui, *Griffith.* Karen Hills, *Wallich.*—Tonkin, N. Guinea.

VAR. *Ma-yuen*, Stapf mss.; annual, fruit crustaceous or chartaceous. C. Ma-yuen, *Roman. in Bull. Soc. Acclim. Paris.* Ser. 3, viii. (1881) 442. Sikkim and the Khasia hills, ascending to 5000 ft. (cult.). Burma, *Watt.*—Cochinchina, Borneo, Ins. Philipp.

DOUBTFUL SPECIES.

C. AQUATICA, *Roxb. Fl. Ind.* iii. 571; floating and creeping from 50–100 ft., leaves linear most acute, margins hispid, male spikes drooping many-fld., flowers 3-fold, middle one pedicelled fem., corolla 6–7-valved, seeds turbinate." "Floating in margins of lakes in Lower Bengal," *Roxb.* This species is unknown to me and to the officers of the Calcutta Bot. Gardens.

29. **POLYTOCA,** *Br.*

Tall branching grasses; nodes bearded; flg. branches fascicled, spathaceous. *Leaves* long, flat. *Spikes* solitary or panicled, bisexual and fem. below, or the upper male only, rachis jointed; spikelets geminate, a sessile and a pedicelled. *Male spikelets* lanceolate, 2-fld.; gls. 4, I many-nerved, 2-keeled; II 5–7-nerved; III and IV hyaline, paleate, triandrous; anthers very long. *Lodicules* cuneate. *Fem. spikelets* imbricate, the pedicelled imperfect, its pedicel confluent with the rachis; gls. of sessile spikelet 4, I oblong, coriaceous, margins inflexed

embracing the rachis, at length crustaceous; II thin, acuminate; III hyaline, epaleate; IV hyaline, paleate, fertile. *Staminodes* and *lodicules* 0. *Ovary* minute; styles long, stigmas slender. *Grain* very small, orbicular, enclosed in the hardened outer gls.—Species 8, tropical Asiatic and Australian.

* *Infl. mostly compound; male spikelets terminal, superposed, hairy; fem.* 3–7. *Pedicelled fem. spikelets of one bract-like gl. terminating the joint of the rachis.—Spathes always tightly closed.*

1. **P. bracteata,** *Br. in Bennett Pl. Rav. Jav.* 20, t. 5; male spikes rather stiff, pedicelled spikelets mostly (nearly all) rudimentary and adnate to the rachis. *Steud. Syn. Gram.* Coix heteroclita, *Roxb. Fl. Ind.* III. 572; *Wall. Cat.* n. 8627.

SIKKIM TERAI, ASSAM and the KHASIA HILLS, ascending to 5000 ft. BURMA, on the Shan hills, *Collett.*—DISTRIB. Tonkin.

Stem 3–5 ft., stout or slender; sheaths and leaves glabrous, or hirsute with tubercled-based hairs. *Leaves* 1½–2 ft. by ⅔–1 in., margins rough, base contracted. *Inflorescence* 3–6 in., usually long-pedicelled and digitate; lower branches spreading or deflexed; rachis hairy. *Male spikelets* ¼ in., glabrous or pubescent; fem. spikelets less than ¼ in., pale, shining; rudimentary pedicelled spikelets lanceolate, ½–1 in. long, at length spreading; gl. I oblong, obtuse or emarginate, 2-keeled.

2. **P. Wallichiana,** *Benth. in Journ. Linn. Soc.* xix. (1881) 52; male spikes slender flexuous, pedicelled spikelets free. Cyathorhachis Wallichiana, *Nees ex Steud. Syn. Gram.* 403.—Gen. Nov. *Wall. Cat.* n. 8629.

BURMA; Prome and Tenasserim, *Wallich*; Pegu, *M'Lelland*, &c.; Tenasserim, *Wallich, Helfers.*

Stem leaves and sheaths glabrous or hispid with tubercle-based bristles. *Leaves* 2–3 ft. by 1–1¼ in., lower narrowed from the middle to the base. *Terminal infl.* often long peduncled, branches 2–2½ in.; lateral more or less enclosed in the spathe; rachis hairy. *Male spikelets* ¼ in.; fem. as long, pale, shining; rudimentary pedicelled spikelets ¾ in., lanceolate, at length spreading.

** *Terminal infl. only compound; male not spathaceous, fem. spathaceous, spathe at length expanded, lateral of simple spikes. Pedicelled fem. spikelets of* 2 *gls., pedicels adnate to the rachis.*

3. **P. Cookii,** *Stapf in Hook. Ic. Pl.* t. 2333; male infl. very fragile, spikes 2–3 in., pedicelled spikelets free, fem. spikelets glabrous, gl. I 3-lobulate at the tip.

N. CANARA and the CONCAN, *Jacquemont*, &c.

Annual. *Stem* 3 ft. and leaves more or less hispid with tubercle-based hairs. *Leaves* 1½–2 ft. by 2–3 in., margins thickened. *Male infl.* often long-peduncled, rachis villous; spikelets ¼ in. *Fem. spikes* 1 in. long; spathe 1–1½ by ⅓-½ in., at length open above; rachis glabrous; spikelets ¼ in.; rudimentary gl. like I and II of male, but smaller.

** *All infls. of simple bisexual spikes; spikelets glabrous.*

4. **P. semiteres,** *Benth. in Gen. Plant.* iii. 1113. Spathes 1–1½ in. always closed, fem. spikelets 2 or more. Chionachne Wightii, *Munro ex Benth. in Gen. Plant. l. c.* Tripsacum? semiteres, *Wall. Cat.* n. 8628.

The DECCAN PENINSULA; Palamcotta, *Wight.* BURMA; Taong-dong hills, *Wallich.*

Rootstock creeping; stems 2–2½ ft., stiff, glabrous. *Leaves* 8–10 by ⅛–¼ in., rigid, tip setaceous, margins thickened; sheaths glabrous or hairy. *Spathe* 1–1½ in. *Spikes* 1½–3 in., male part stout, rachis glabrous; spikelets ¼–⅓ in. glabrous;

pedicelled spikelets adnate to the rachis; fem. spikelets rather longer, gl. of pedicelled 0 or minute.

5. **P. barbata,** *Stapf mss.*; branches of infl. many umbelled, spathes ½ in. at length open, fem. spikelets solitary, margins of gl. I keeled tip entire. C. arundinacea, *Koen. ex Willd. Sp. Pl.* iv. 203 (*non Lamk.*). Coix barbata, *Roxb. Fl. Ind.* iii. 569; *Wall. Cat.* n. 8626; *Dalz. & Gibs. Bomb. Fl.* 289. C. crypsoides, *C. Muell. in Bot. Zeit.* xix. (1861) 334. C. gigantea, *Herb. Russ. ex Wall. Cat. l. c.* C. Koenigii, *Spreng Syst.* i. 228; *Thw. Enum. Pl. Zeyl.* 357. Chionachne barbata, *Br. in Benn. Pl. Rar. Jav.* 18; *Trim. Cat. Ceyl. Pl.* 106; *Aitchis. Cat. Panjab. Pl.* 157; *Duthie Grass. N.W. Ind.* 11, *Fodd. Grass. N. Ind.* 19. Ch. Koenigii, *Thw. Enum. Pl. Zeyl.* 369.

Hot and damp parts of INDIA, from the Panjab to Assam and Munnepore, and southward to CEYLON.—DISTRIB. Java.

Stems 3–5 ft., glabrous or with the leaves and sheaths bristly with tubercle-based hairs. *Leaves* 1–2 ft. by ¼–¾ in., finely acuminate, margin thickened. *Spikes* 1–1½ in., rachis usually glabrous. *Male spikelets* ¼ in., glabrous or softly pilose, keels ciliolate; *fem.* ⅛ in., glabrous, pale; gl. of pedicelled minute or 0.

6. **P. punctata,** *Stapf mss.*; branches of infl. few unequal, terminal subumbellate, outer spathes long green, gl. I of fem. spikelets constricted in the middle, then suddenly dilated into an ovoid obtuse claw, keels broad. Sclerachne punctata, *Br. in Benn. Pl. Rar. Jav.* 15, t. 4. Chionachne Massii, *Balans. in Journ. de Bot.* (Paris, 1890), 78. Coix sulcata, *Herb. Rottl.*

The DECCAN PENINSULA, *Rottler.*—DISTRIB. Java, Tonkin?

Stem slender, branched, glabrous, and leaves glabrous or sparsely hairy. *Leaves* 6–8 by ¼ in., linear-lanceolate, flaccid. *Spathes* of lower outer branches long, lanceolate. *Spikes* ½ in.; male spikelets one pair, ⅛ in., glabrous; fem. ⅓ in., pale; gl. of pedicelled minute.

29*. ZEA, *Linn.*

A tall stout annual monœcious grass. *Leaves* broad, flat. *Spikelets* unisexual, males in terminal racemed spikes; fem. in solitary axillary stout sheathed spikes, rachis thick, inarticulate, spongy. *Male spikelets* 2-fld., 2-nate, a sessile and a pedicelled at each of the alternating teeth of the inarticulate rachis; glumes 4, acute; I and II subequal, membranous, empty; I enclosing the hyaline paleate III and IV. *Lodicules* fleshy. *Stamens* 3, anthers linear. *Fem. spikelets* 1-fld., sessile, densely crowded in many vertical series on the thick cylindric rachis; glumes 4, membranous, I and II very broad, obtuse or emarginate; III hyaline, paleate, empty; IV hyaline, often 2-fld. *Lodicules* 0. *Ovary* obliquely ovoid, plano-convex; style very long, 2-fid, arms papillose. *Grain* large, subglobose or flattened, surrounded by the marcescent gls.

Z. Mays, *Linn. Sp. Pl.* 971; *Beauv. Agrost.* 136, t. 24, f. 3; *Kunth Enum. Pl.* i. 19, *Suppl.* 15; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 3, 4. *Bonafous Hist. Nat. Mays* (*Paris*, 1836), t. 1–19; *Doell in Mart. Fl. Bras.* ii. II, 30, t. 11; *Roxb. Fl. Ind.* iii. 349; *Grah. Cat. Bomb. Pl.* 240; *Duthie Field & Gard. Crops* 25, t. 5; *Miq. Fl. Ind. Bat.* iii. 477. Z. alba, americana & vulgaris, *Mill. Gard. Dict. Ed.* viii. n. 1, 2, 3. Z. segetalis, *Salisb. Prodr.* 28. Mays zea, *Gærtn. Fruct.* i. 6, t. i. f. 9.

Cultivated throughout the hotter parts of INDIA.—Native of Peru.

30. **DIMERIA,** *Br.*

Slender annual or perennial grasses. *Leaves* narrow. *Spikelets* 1-fl., unilateral on a single terminal spike or several racemed spikes, sessile or pedicelled, rachis inarticulate. *Glumes* 4, I linear, rigid; II broader compressed; III smaller, hyaline, empty; IV hyaline, bisexual, entire or 2-lobed, keeled, 1-nerved, usually awned; awn terminal or in the sinus, capillary, twisted at or below the middle. *Lodicules* minute or 0. *Stamens* 2, filaments short; anthers small. *Styles* distinct, stigmas short. *Grain* linear, laterally compressed, free.—Species 12 or 14, tropical Asiatic and Australian;—all want revision with more copious material.

* Spike solitary; spikelets conniving; gl. I erect, II not appressed to the rachis of the spike.

1. **D. pusilla,** *Thw. Enum. Pl. Zeyl.* 369; stem filiform, leaves short, rachis very slender compressed-trigonous, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long sessile or pedicelled, gl. II acuminate awned. *Hack. Monogr. Androp.* 78; *Trim. Cat. Ceyl. Pl.* 107.

The Deccan Peninsula and Ceylon (*CP.* 957.)

Very variable, 6–18 in. high.—Amongst the many forms the following appear the most distinct. I cannot satisfactorily identify them with Hackel's descriptions.

D. pusilla, proper; stems 6–8 in. filiform, rachis of spike filiform trigonous smooth or scaberulous on the angles, spikelets pedicelled, pedicel usually naked below villous upwards. D. pusilla, *Thw. l. c.* ?*Hack. Monog. Androp.* 78. Ceylon; at Kokotodua, *Gardner* (CP. 957 in part).—This and the following I have described from Thwaites' type specimens.

Var. *pallida*, Thw. mss.; stem as in *D. pusilla* proper, spikelets all sessile, or the lowest on the spike pedicelled, awn of gl. I shorter. ?*D. Thwaitesii*, Hack. l. c.—Ceylon at Damboul, *Thwaites* (CP. 3955).

Var. *elatior*; stem 12 in., stouter, somewhat branched, spike longer, rachis as broad as the shortly pedicelled spikelets keeled down the centre margins scaberulous, awn of gl. I sometimes as long as the gl.—Ceylon; at Trincomalee; *Glenie* (CP. 957).

Var. *Lawsoni*, stem short leafy, spike inclined, rachis broader than the sessile villous spikelets, margins ciliate, glume II shortly awned.—Malabar; Wynaad, *Lawson*.

2. **D. Kurzii,** stem 10–18 in. erect, rachis of spike rather broader than the sessile spikelets strongly ciliate, gl. II acute not awned, more or less ciliate.

Burma, *Kurz* (n. 2741); Mergui, *Griffith*.

Much stouter than any form of *D. pusilla*, which the spike closely resembles; but the spikes are longer, $\frac{2}{3}$–2 in.; spikelets $\frac{1}{10}$ in. long.—The spikes are sometimes inclined or recurved as in the species with several on the peduncle, hence two spikes may occur. Kurz's specimens are very slender, 12–18 in. long; Griffiths' solitary one is in a very young state, with broader leaves sheathing the spike.

** Spikes 2–3; erect spreading or involute; gl. I erect or spreading; II usually closely appressed to the rachis.

† *Rachis capillary.*

3. **D. Hohenackeri,** *Hochst. ex Miq. in Verh. Ned. Inst.* III. iv. (1851) 35, stem capillary, spikes very slender, rachis filiform trigonous, spikelets distant narrow pedicelled, gl. II acuminate dorsally ciliate. *Hack. Monog. Androp.* 79; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891), 189.

Psilostachys Hohenackeri, *Steud. Syn. Gram.* 413; *Hochst. in Flora* (1856), 90.

N. CANARA and MANGALORE, in rice fields, *Hohenacker, Talbot.*

Stem 6–8 in. *Leaves* short, upper sheathing. *Spikes* 1–1½ in.; rachis with scabrid angles. *Spikelets* $\frac{1}{10}$ in., awns twice as long; gl. I. very narrow, acuminate, nearly glabrous, at length divaricate.

†† *Rachis trigonous or linear, sometimes as broad or broader than gl. II, joints much shorter than the spikelets.*

4. **D. ornithopoda,** *Trin. Fund. Agrost.* 167, t. 14; spikes very slender, rachis flexuous, spikelets $\frac{1}{16}$ in. sessile or subsessile, glume II linear acute dorsally ciliate. *Hack. Monogr. Androp.* 81. D. filiformis, *Hochst. in Hohenack. Pl. Ind. Or.* n. 231. D. stipæformis, *Miq. Prolus. Fl. Jap.* 176; *Franch. & Sav. Enum. Pl. Jap.* i. 187. ?D. diandra, *Griff. Notul.* iii. 71, *Ic. Pl. Asiat.* t. 157, f. 2. D. psilobasis, *F. Muell. Fragm.* vii. 104. D. tenera, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833), 335; *Benth. Fl. Austral.* vii. 523. Didactylon simplex & ramosum, *Zoll. & Mor. Syst. Verz.* 100. Andropogon filiformis, *Roxb. Fl. Ind.* i. 256; *Steud. l. c.* 372. A. Roxburghianus, *Schult. Mant.* ii. 451. A. stipæformis, *Steud. l. c.* 377. Psilostachys filiformis, *Dalz. & Gibs. Bomb. Fl.* 305.—Dimeria, *Wall. Cat.* n. 8839, 8840.

Throughout INDIA; from Nepal and the Khasia Hills to the Deccan, Burma and the Nicobar Islds. (not in Ceylon).—DISTRIB. Malay Islds., Japan, Trop. Austral.

Annual, much branched, leafy. *Leaves* 1–3 in., erect; sheaths glabrous or pilose. *Spikes* 2, rarely 3; rachis about as broad as the spikelets, margins scaberulous, costa strong. *Spikelets* linear, acuminate, callus villous; gl. I slender, nearly glabrous; III short, acute; palea 0.—Hackel has 6 varieties of this species, of which more might be made.

5. **D. Woodrowii,** *Stapf in Hook. Ic. Pl.* t. 2312; spikes 2 circinately involute, rachis rigid glabrous, spikelets very shortly pedicelled, callus shortly bearded, gl. I and II subequal acute, III linear hyaline, IV shortly awned.

The CONCAN; Ratnagherry district, and near Goa, *Woodrow.*

Annual. *Stem* 3–6 in. slender, leafy to the top, simple or sparingly branched; upper internode (or peduncle) with its leaf abruptly deflexed after flowering. *Leaves* 2–3 in., linear, acuminate, erect, strict, glabrous or sparsely hairy; ligule very short, hyaline. *Spikes* ¾–1 in., at first erect, rachis dorsally convex, concave ventrally. *Spikelets* few, rather distant, suberect, divergent as the rachis incurves; gl. I glabrous or sparsely hairy; awn of IV about twice as long as its glume; palea 0.—A very peculiar species, at once recognized by the two spikelets forming together a hoop.

6. **D. connivens,** *Hack. Monogr. Androp.* 689; annual, rachis of spike nearly as broad as the spikelets ciliate, spikelets ⅛ in. subsessile, callus minutely villous, gl. I very slender ciliate, II oblong-lanceolate acuminate dorsally ciliate.

CHOTA NAGPORE, alt. 2000 ft., *Clarke.*

Stems ascending, 6–10 in. *Leaves* short, erect. *Spikes* 1–1¾ in.; rachis nearly straight, costate. *Spikelets* erect, closely imbricating; gl. I slender, sparsely ciliate; awn twice as long as the spikelet.

7. **D. Lehmanni,** *Hack. Monogr. Androp.* 82; spikes slender spreading, rachis undulate scabrid or ciliate, spikelets sessile ⅛ in. long, callus very shortly bearded, gl. I and II subacute, I narrowly linear, keel ciliate,

III oblong. D. ornithopoda, *Thw. Enum.* 369. Pterygostachyum Lehmanni, *Nees ex Steud. Nom. Ed.* II. ii. 412, *Syn. Gram.* 413.

Ceylon, *Macrae, Walker, Thwaites.*

Annual, branched, 8–10 in. high. *Leaves* erect, flat, acuminate.

Var. α; glabrous, rachis of spike ciliate, spikelets awned. (C.P. 952.)

Var. β; rachis of spike scaberulous, spikelets not awned. (C.P. 955.)

8. **D. pubescens,** *Hack. Monogr. Androp.* 83; spikes stout spreading, margins of broad straight rachis ciliate, spikelets $\frac{1}{7}$ in. sessile silky, gl. I and II shortly acuminate, I narrowly linear with membranous margins $\frac{1}{3}$ longer than III. D. ornithopoda, *var.* γ, *Thw. Enum. Pl. Zeyl.* 369.

Ceylon, *Gardner*; Pasdoon Corle, *Thwaites* (C.P. 956).

Perennial, branched from the base, glabrous to villously hairy. *Racemes* 2–2½ in., often solitary and inclined; rachis flat, $\frac{1}{12}$ in. broad or less. *Spikelets* densely imbricate; gl. I and II silky all over; awn twice as long as the spikelet or longer.

9. **D. fuscescens,** *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 335; spikes stout spreading, rachis undulate margins smooth or scaberulous, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. sessile, callus minute or 0, gl. I and II acute or acuminate, I narrowly linear much longer than III, margins of II broadly membranous. *Hack. Monogr. Androp.* 84; *Trim. Cat. Ceyl. Pl.* 107; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 189. D. ornithopoda, *var.* β, *Thw. Enum. Pl. Zeyl.* 369.—Dimeria, *Wall. Cat.* n. 8841.

Nepal, *Wallich.* Khasia Hills, alt. 4–5000 ft., *Griffith*, &c. Tenasserim, *Helfer.* The Concan, *Lisboa.* Ceylon, *Gardner, Thwaites* (C.P. 3256).

Perennial, 2–3 ft. high, stout, simple or branched. *Leaves* glabrous or hairy. *Spikes* 2–4 in.; rachis compressed trigonous. *Spikelets* reddish-brown; awn twice as long as the gls.—The Tenasserim specimens are small and in a poor state.

10. **D. alata,** *Hook. f.*; spikes 2–3 rather stout, spikelets $\frac{1}{10}$ in. sessile glabrous callus naked, gl. I scaberulous, II dimidiate-ovate keel broadly winged, III nearly as long as II, awn 0. D. ornithopoda δ mutica, *Thw.* (*in part*).

Ceylon, *Thwaites* (C.P. 955 of 1864).

Annual. *Stems* 6–18 in., tufted, slender, erect. *Leaves*, 6–12 by $\frac{1}{6}$–$\frac{1}{5}$ in., erect, strict, narrowed to the base, and sheaths hirsute with long spreading hairs. *Spikes* 3 in., strict, spreading; rachis $\frac{1}{20}$ in., stout, straight, margins scaberulous. Gl. I divaricate; II appressed to the rachis, broadly hyaline; wing opaque, strongly ciliate; III oblong, ciliate, 1-nerved; IV obovate-oblong, ciliate.—The small glabrous spikelets and broadly winged gl. II distinguish this species from *D. fuscescens.*

*** Spikes 4–10 (rarely 3) digitate or fascicled.

11. **D. gracilis,** *Nees ex Steud. Syn. Gram.* 413; leaves not contracted above the sheath, spikes 3–10 long slender flexuous quite glabrous, rachis filiform subtrigonous, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in., pedicels long slender glabrous, callus bearded. *Hack. Monogr. Androp.* 88; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 190. D. laxiuscula, *Thw. ex Trim. in Journ. Bot.* xxiii. (1885), 272, *Trim. Cat. Ceyl. Pl.* 107.

The Concan, *Law*; on the Ghats, *Lisboa.* Ceylon, *Macrae, Thwaites*, &c. (C.P. 3863).

Perennial, 1–2 ft. high, stout or slender. *Spikes* 1½–3 in., pale red-brown; gl. I and II, lanceolate, ciliate; I scabrid above the middle or all over; II with narrowly membranous margins; awn twice as long as the spikelet.

12. **D. leptorhachis,** *Hack. Monogr. Androp.* 89; leaves contracted

above the sheath, spikes slender, rachis filiform ciliolate at the nodes, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in., pedicels very short thickened, callus bearded. D. pilosissima, *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 107 (*not of Trin.*).

Tenasserim, *Helfer, Griffith* (*Kew distrib.* 6799). Ceylon; on Adam's Peak (C.P. 24, 3261).

Perennial, stout. *Leaves* glabrous or villous. *Racemes* 2–6 in.; rachis straight or flexuous; internodes $\frac{1}{6}$–$\frac{1}{3}$ in. in Tenasserim specimens, much shorter in Ceylon ones. *Spikelets* pale or dark, red-brown; gl. I and II acuminate, ciliate in Ceylon, scaberulous in Tenasserim; II with narrowly membranous margins.

31. **IMPERATA,** *Cyrill.*

Perennial, erect, often tall grasses. *Spikelets* 1-2-fld., in spiciform or thyrsiform silvery-silky panicles, binate, both pedicelled, upper fl. perfect, lower imperfect or 0. *Glumes* 4, membranous, awnless; I and II lanceolate, hairy; III much smaller, hyaline, glabrous; IV still smaller, hyaline, glabrous; palea hyaline, glabrous. *Stamens* 1–2; anthers large, linear. *Styles* connate at the base, stigmas linear. *Grain* small, oblong, free.—Species 5, tropical, chiefly American; 2 Asiatic, one also European.

1. **I. arundinacea,** *Cyrill. Pl. Rar. Neap. Fasc.* ii. 26, t. 11; panicle very narrow spiciform, branches short appressed, gl. I 5–9-nerved, stamens 2. *Br. Prodr.* 204; *Kunth Enum. Pl.* i. 477; *Hack. Monogr. Androp.* 92; *Steud. Syn. Gram.* 405; *Reichb. Ic. Fl. Germ.* t. 55; *Boiss. Fl. Orient.* v. 452; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 14, *Indig. Fodd. Grass.* t. 15, *Fodd. Grass. N. Ind.* 22; *Aitchis. Cat. Punjab. Pl.* 173. I. Allang, *Jungh. in Tijdschr. Nat. Gesch.* vii. 295; *Steud. l. c.* 405 (Alang). I. condensata, *Steud. l. c.* 431. I. cylindrica, *Beauv. Agrost.* 165. I. filifolia, *Nees ex Steud. l. c.* I. Koenigii, *Beauv. Agrost.* 165; *Wall. Cat.* n. 8850. I. pedicellata, *Steud. in Flora*, xxix. (1846) 22, *Syn. Gram. l. c.* I. Sieberi, *Opiz. Natural.* x. (1825) 190. I. Sisca, *Beauv. ex Steud. Nom. Ed.* II. i. 805. I. Thunbergii, *Nees ex Wall. Cat.* n. 8851. Saccharum cylindricum, *Lamk. Encycl.* i. 594; *Roxb. Fl. Ind.* i. 234; *Grah. Cat. Bomb. Pl.* 239; *Griff. Notul.* iii. 80. S. diandrum, *Koen. ex Retz. Obs.* v. 16. S. europæum & S. indum, *Pers. Syn.* i. 103. S. Koenigii, *Retz. Obs.* v. 16. S. spicatum, *Burm. ex Kunth l. c.* S. laguroides, *Pourr. in Mem. Acad. Toul.* iii. (1788) 326. S. Ravennæ, *Bieb. Fl. Taur. Cauc.* iii. 51. Lagurus cylindricus, *Linn. Syst. Nat. Ed.* x. 878. Calamagrostis Lagurus, *Koel. Descr. Gram.* 112; *Host Gram. Austr.* iv. t. 40.

Hotter parts of India, from the Panjab southward and eastward to Malacca and Ceylon.—Distrib. All warm countries.

Rootstock creeping. *Stem* 1–3 ft., solid, nodes glabrous or bearded. *Leaves* erect, often exceeding the stem. *Panicle* 3–8 in., silvery with dark anthers and stigmas. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., callus-hairs about twice as long as the gls.; gl. I rather thickened towards the base, dorsally hairy, tip obtuse; II as long as I, 3–7-nerved; III = $\frac{1}{3}$–$\frac{1}{2}$ II, oblong, irregularly toothed, nerveless; IV ovate, acute, toothed, faintly 1-nerved or nerveless; palea about half as long as the gl., quadrate, retuse or toothed, nerveless, glabrous.—Hackel distinguishes the Indian form as var. *Koenigii*, having villous nodes and broader less rigid leaves, but some of the Indian specimens appear to me quite like the Western.

Var. *latifolia*; stem 3–4 ft. very robust, nodes glabrous, leaves long $\frac{1}{2}$–$\frac{2}{3}$ in. broad, palea of gl. IV with long-ciliate lobes.—Tropical Himalaya, from Kumaon to Assam.

2. **I. exaltata,** *Brongn. Voy. Coq. Bot.* 101 (*excl. Syn.*); panicle thyrsiform, lower branches elongate, gl. I 3–5-nerved, stamen 1. *Hack. Monogr. Androp.* 99. I. caudata, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 331. ? I. jaculatoria, *Roem. & Sch. Syst.* ii. 289. I. ramosa, *Anderss. in Œfvers. Vet. Akad. Stockh.* (1855) 158. Saccharum Alopecurus, *Nees in Hook. Kew Journ.* ii. (1850) 100; *Steud. Syn. Gram.* 406. S. caudatum, *Mey. Prim. Fl. Esseq.* 68. S. confertum, *Presl Rel. Hænk.* i. 346. S. contractum & dubium, *H. B. & K. Nov. Gen. et sp.* 182, 183. ? S. jaculatorium, *Lour. Fl. Cochinch.* 53; *Poiret Encycl. Suppl.* ii. 70. S. macilentum, *Chauv. ex Steud. l. c.* S. negrosense, *Steud. l. c.* Anatherum porto-ricense, *Spreng. Syst.* i. 290. A. caudatum, *Schult. Mant.* ii. 445. Syllepis polystachya, *Fourn. ex Hack. in Mart. Fl. Bras.* ii. III. 251.

SINGAPORE, *Cuming.* BURMA; Mergui, *Griffith.*—DISTRIB. Malaya, N. Hebrides, Am. trop.

Stem tall, up to 7 ft., slender, fistular, glabrous, nodes glabrous. *Leaves* 2–3 ft. by $\frac{3}{4}$–1 in., linear, finely acuminate, smooth, glabrous or sparsely pubescent; sheath glabrous; ligule very short. *Panicle* 12–18 in., 4–5 in. broad at the base, narrowly subpyramidal; rachis slender; lower branches 3–4 in. long, branchlets and pedicels ciliate. *Spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in., like those of *I. arundinacea*, but gl. I and II fewer nerved; III = $\frac{1}{2}$ II oblong, deeply irregularly toothed above the middle, glabrous, nerve very slender; IV cuspidately lanceolate from an ovate base, quite entire, glabrous; palea quadrate, many-toothed, glabrous.

32. **MISCANTHUS,** *Anderss.*

Tall perennial grasses. *Spikes* long, simple and branched, very slender, crowded at the top of the peduncle into a nodding fan-shaped corymb; rachis obscurely jointed. *Spikelets* very numerous, in unequally pedicelled pairs, 1-fld., dorsally subcompressed, one or both usually awned, callus with long silky hairs. *Glumes* 4; I chartaceous, nearly flat with narrow incurved margins; II similar but more convex; III hyaline, ovate, epaleate; IV hyaline, 2-fid or 2-toothed, with a long awn (rarely short or 0) in the sinus; palea minute. *Lodicules* cuneate. *Stamens* 2–3. *Styles* free, stigmas rather short. *Grain* linear-oblong, free.—Species 5–6, Asiatic and Polynesian.

1. **M. nepalensis,** *Hack. Monogr. Androp.* 104; spikes very many densely crowded 5–7 in., hairs of callus much longer than the spikelet. Eulalia nepalensis, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 333, *Sp. Gram. Ic.* t. 332. Pollinia nepalensis, *Benth. ex Duthie Grass. N.W. Ind.* 16.—Erianthus, *Wall. Cat.* n. 8848.

TEMPERATE HIMALAYA; from Garwhal to Bhotan, alt. 5–7500 ft., *Wallich*, &c. KHASIA HILLS, alt. 4–5000 ft. NAGA HILLS, *Prain.*

Stem 3–6 ft., as thick as a goose-quill in large plants. *Leaves* 6–18 in. by $\frac{1}{3}$–$\frac{1}{2}$ in., margins smooth, midrib stout; ligule rounded. *Spikes* flexuous; rachis capillary, glabrous; pedicels $\frac{1}{6}$ in. *Spikelets* $\frac{1}{14}$ in. long, purplish or golden yellow, shining; gl. I and II minutely 2-toothed.

2. **M. nudipes,** *Hack. Monogr. Androp.* 109; spikes few 2–3 in., hairs of callus not longer than the spikelet. Erianthus nudipes, *Griseb. in Nachr. Akad. Wiss. Goett.* (1868) 92.

SIKKIM HIMALAYA, alt. 9–12,000 ft., *J. D. H.* UPPER ASSAM; Mishmi Hills, *Griffith.*

Much smaller than *M. nepalensis*, 2–3 ft. high, with leaves 4–10 in. long, the margins of which are smooth as in that plant; spikelets very much longer, $\frac{1}{8}$–$\frac{1}{5}$ in. long, and narrower.

33. **SPODIOPOGON,** *Trin.*

Tall grasses. *Leaves* often long-petioled. *Spikelets* 1–2-fld., panicled, laterally compressed or subterete, 2–3-nate, lower sessile male, upper bisexual, rachis jointed. *Glumes* 4; I and II subequal; I lanceolate, 5–9-nerved, tip acuminate or toothed; II membranous, lanceolate, 3–7-nerved; III hyaline, paleate or not, 3-androus or empty; IV 2-fid or 2-partite with a very slender exserted awn in the sinus; palea shorter. *Lodicules* cuneate. *Anthers* linear. *Stigmas* linear. *Grain* free, narrowly fusiform.—Species about 5, Asiatic.

1. **S. albidus,** *Benth. in Journ. Linn. Soc.* xix. (1881) 66; decumbent, leaves long-petioled broad flaccid, panicle narrow, spikelets 2-fld. laterally compressed, silkily villous, gl. I membranous. *Hack. Monogr. Androp.* 185. Andropogon albidus, *Hb. Heyne.* A. rhizophorus, *Steud. Syn. Gram.* 381; *Duthie Fodd. Grass. N. Ind.* 26.—Andropogon? *Wall. Cat.* n. 8821.

RAJPOOTANA; on Mt. Aboo, *Duthie.* DECCAN PENINSULA, from the Concan to Travancore.

A weak struggling tufted branched annual?, 2–4 feet; stem very slender, much branched, leafy. *Leaves* 6–10 by $\frac{1}{4}$–$\frac{3}{4}$ in., flaccid, linear-lanceolate, acuminate, 1-nerved, usually suddenly narrowed into a slender petiole 1–3 in. long; sheath 3–5 in.; ligule oblong, glabrous. *Panicle* at first enclosed in a long narrow spathaceous leaf-sheath; rachis compressed, ciliate. *Spikelets* about $\frac{1}{6}$ in. long, white; shortly pedicelled. *Gl.* I minutely 2-mucronate, 7-nerved; II broader, much compressed; III truncate tip erose.

2. **S. dubius,** *Hack. Monogr. Androp.* 186; erect, leaves sessile long narrow and sheaths softly hairy, panicle narrow, spikelets 1-fld. silkily villous, gl. I chartaceous 7–9-nerved.—Andropogon, n. 16, *Herb. H. f. & T.*

TEMPERATE HIMALAYA; from Kashmir to Garwhal, alt. 6–8000 ft., *Thomson*, &c.

Perennial. *Stem* 2–4 ft., solid, as thick as a goose-quill, quite smooth. *Leaves* 12–18 by $\frac{1}{4}$–$\frac{1}{3}$ in., smooth hairy or villous, base villous, margins scaberulous, base villous, midrib broad, white; sheath glabrous; ligule densely villous. *Panicle* 6–8 in., narrowly oblong, erect, very dense-fld., pale; pedicels very short. *Spikelets* $\frac{1}{5}$ in.; gl. I acuminate, dorsally convex, margins narrowly incurved; II as long, subchartaceous, 3–5-nerved, hairy dorsally, sometimes obtuse and apiculate; III oblong, obtuse, hyaline, 1-nerved ciliate; IV shorter than II, cleft into lanceolate segments with a slender interposed awn as long as the spikelet, 3-nerved below the middle; palea lanceolate, 2-fid.

3. **S. cotulifer,** *Hack. Monogr. Androp.* 187; tall, erect, leaves long sessile and petioled, panicle lax effuse branches and long capillary pedicels short subclavate, spikelets 1-fld. lanceolate terete sparsely hairy, gl. I and II coriaceous strongly nerved. Eulalia cotulifera, *Munro ex Miq. Prolus. Fl. Jap.* 177; *Franch. & Sav. En. Pl. Jap.* ii. 189. Miscanthus cotulifer, *Benth. in Journ. Linn. Soc.* xix. (1881) 65. Eccoilopus andropogonoides, *Steud. Syn. Gram.* 124. Andropogon cotulifer, *Thunb. Fl. Jap.* 41.

WESTERN TEMPERATE HIMALAYA, alt. 4–6000 ft., from Kashmir, *Clarke*, to

Garwhal, *Jacquemont, Duthie.* KHASIA HILLS, alt. 3–4000 ft., *J. D. H. & T. T.*—DISTRIB. China, Japan.

Perennial. *Stem* 3–8 ft. or more from a woody branched stock, as thick as a swan's quill or less. *Leaves* 2–3 ft. by $\frac{1}{2}$–$\frac{2}{3}$ in.; sheath long, grooved; ligule short. *Panicle* 6–12 in., rachis slender, terete, branches whorled, capillary, lower 1–3 in., lax-fld., flowering towards the ends; pedicels $\frac{1}{10}$–$\frac{1}{6}$ in., clavellate, tips cupped. *Spikelets* $\frac{1}{5}$ in., green; tall callus bearded; gl. I and II very strongly 7–9-nerved, nerves scaberulous, tips 2-dentate and very shortly awned; III oblong, tip rounded, scaberulous above the middle, not ciliate; palea lanceolate, subciliate; IV glabrous, cleft to below the middle into setiform lobes, awn twice as long as the spikelet; palea large, broadly ovate, obtuse, ciliate, nerveless.—A peculiar grass very unlike the other species.

34. **POLLINIA,** *Trin.*

Annual or perennial grasses. *Spikes* subdigitately approximate or fascicled, hirsute silky or ciliate, rachis fragile. *Spikelets* binate a sessile and pedicelled rarely both pedicelled, 1-fld. or the sessile 2-fld. *Glumes* 4, I membranous or coriaceous, dorsally flattened or concave, truncate often narrowly, or tip 2-toothed, margins narrowly inflexed throughout its length; II as long, usually laterally compressed, keeled, acute, rarely awned; III hyaline, ciliate, rarely neuter or male, paleate (sometimes represented by a gl.-like palea); IV very short, hyaline, entire 2-fid or 2-auricled or reduced to a dilated base of the long twisted exserted awn; palea small or 0. *Lodicules* obliquely truncate. *Stamens* 3, rarely 2. *Stigmas* long. *Grain* free.—Species about 30, tropical and subtropical of the Old World.

The characters by which *Pollinia* is distinguished from *Ischæmum* are very unsatisfactory. The colour of the hairs of the spikes in Sect. *Eulalia* cannot be altogether depended upon; nor can the sexuality of the spikelets and presence or absence of gl. III be in Sect. *Leptatherum.* The apparent replacement of gl. III in some species by a palea as long as gl. I and concave towards it, first observed and commented on by Hackel (Androp. 171) is a very curious departure from the normal condition of the spikelet in *Andropogoneæ.* It is not confined to *Pollinia.*

Sect. I. *Stem* erect. *Leaves* not conspicuously constricted or petioled above the sheath. *Gl.* I as long as II, narrowly truncate; II not broadly truncate; III or its palea present.

* Glume II of sessile spikelets awned. Basal sheaths of stem naked.

1. **P. articulata,** *Trin. in Bull. Sc. Acad. Petersb.* (1836) 71; annual, very slender, leaves usually filiform, spikes usually very many, hairs of rachis white, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. brown, gl. I narrowly truncate, keels villous below with white hairs, II glabrous except the margins, III (? palea of gl. IV) ovate obtuse, IV narrowly oblong 2-fid or 2-toothed, awn very long ciliate, palea short broad. *Hack. Monogr. Androp.* 153; *Benth. Fl. Hongk.* vii. 525. P. setifolia, *Nees in Hook. Kew Journ.* ii. (1850) 101. Pogonatherum contortum, *Brongn. Bot. Voy. Coq.* 90, t. 17. Erianthus articulatus, *F. Muell. Fragm. Phyt. Austral.* viii. 118. Eulalia concinna, *Nees ex Steud. Syn. Gram.* 412. Andropogon koretrostachys, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 273. A. brunneus, *Heyne in Herb. Rottler.* A. asthenostachys, *Steud. l. c.* 381.—Andropogon, *Wall. Cat.* n. 8813, 8814.

Plains of lower Gangetic Valley and Behar, ascending to 3000 ft. SIKKIM and KHASIA HILLS. CHOTA NAGPUR, *Gamble.* NILGHIRI HILLS; the Wynaad, *Heyne.* BURMA, *Wallich.*—DISTRIB. Malaya, China, Australia.

Stem 1–2 ft., erect, tufted, nodes glabrous. *Leaves* 6–18 in., erect, flexuous, $\frac{1}{11}$–$\frac{1}{10}$ in. broad (except in Wallich's n. 8813), glabrous. *Peduncle* filiform. *Spikes* $\frac{3}{4}$–$2\frac{1}{2}$ in., fascicled, very slender, erect. *Spikelets* amongst the smallest of the genus; gl. IV very variable in length and in depth of lobing, sometimes subentire, awn sometimes 1 in. long.—Hackel has two subspecies, one with the nodes of the spike longer and not disarticulating, which includes the Burmese plant of Wallich, n. 8814, and the Sikkim plant; the other has fragile spikes with much shorter nodes, to which Wallich's Burmese, n. 8813 belongs; this latter is a much taller stouter plant with leaves $\frac{1}{4}$ in. broad and stems thicker than a crow-quill.—What Hackel describes as gl. III appears to me to be the palea of gl. IV, for it surrounds the ovary.

Var. *β, pedicellata,* Hack. mss.; both spikelets long pedicelled. Kumaon, *Duthie.*

2. **P. pallens,** *Hack. Monogr. Androp.* 156; leaves very slender, spikes 5–10 silkily hairy white, rachis slender, spikelets $\frac{1}{8}$ in., gl. I narrow membranous bicuspidate shortly villous, II laxly villous, III oblong obtuse ciliate, IV narrow 2-fid, awn 2–3 times as long as the spikelet.

KHASIA HILLS, alt. 5000 ft., *Griffith,* &c.—DISTRIB. China.

Stem 2–3 ft., slender; nodes glabrous. *Leaves* 12–20 by $\frac{1}{10}$–$\frac{1}{6}$ in., hairy beneath, margins revolute, tips filiform. *Spikes* 2–4 in., slender, silkily hairy. *Spikelets* narrowly lanceolate. *Gl.* I 2-nerved; II with the capillary awn very variable in length, keel and margins ciliate; III oblong, obtuse, ciliate; IV ciliate, oblanceolate, adnate portion of awn forked about half-way down; palea broadly ovate or orbicular, entire, not ciliate.

** Glume II of sessile spikelet not awned.

† Basal sheaths of stem naked.

§ *Spikelets* $\frac{1}{8}$–$\frac{1}{4}$ in.

3. **P. quadrinervis,** *Hack. Monogr. Androp.* 158; spikes 3–6 and pedicels villous with long silvery-grey hairs, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. oblong-lanceolate subacute, gl. I dorsally concave 4-nerved (often obscurely), III glabrous, IV short broadly deeply obcordate, awn 3–4 times as long as the spikelet, palea short broad. P. villosa, *Munro in Benth. Fl. Hongkong,* 420 (*non Spreng.*). Erianthus tristachyus, *Nees in Hook. & Arn. Bot. Beech. Voy.* 241; *et in Pl. Meyer.* 183 (*excl. Syn.*).—Andropogon, *Wall. Cat.* n. 8808.

SUBTROPICAL HIMALAYA; from Simla to Sikkim, the MISHMI, and KHASIA HILLS, alt. 3–5000 ft., *Clarke.* PEGU, alt. 4–6000 ft., *Kurz.*—DISTRIB. China.

Stem 1–2 ft., leafy upwards, nodes glabrous. *Leaves* narrow, glabrous or hairy beneath, or on both surfaces, or with the sheath hirsute, tips finely acuminate; ligule oblong. *Spikes* 3–5, 2–6 in., erect or flexuous. *Spikelets* pale yellow-brown; callus hairs long white; gl. I with hispid keels above, tip contracted minutely truncate, margins rather broadly inflexed; II acute, minutely apiculate, sub 3-nerved, keel smooth, margins ciliate; III linear-oblong, long-ciliate above; IV with the adnate awn forked towards the base, lobes rounded ciliolate; palea lanceolate, ciliolate. —Nees, as Hackel observes, errs in describing the base of the stem as rufous-haired. The Khasia plant has softly villous foliage and has paler spikes, and closely resembles *P. speciosa,* var. *heterotricha.*

Var. *Wightii*; stem tall stout silky below the panicle, leaves $\frac{1}{3}$ in. broad acute, spikes 3–7 in., spikelets nearly $\frac{1}{4}$ in., gl. I 2–4-nerved, IV cuneately obovate broadly

2-lobed.—Pulney Mts., *Wight.* Possibly a species, differing from *quadrinervis* in the broad leaves which have not setaceous tips and in the broad gl. IV.

4. **P. hirtifolia,** *Hack. Monogr. Androp.* 165 ; spikes few, rachis and pedicels villous with long pale violet hairs, spikelets $\frac{1}{6}$ in. linear-oblong, gl. I dorsally slightly concave obscurely 4-nerved, keels laxly villous with long hairs, gl. IV short broadly obovate-oblong 2-lobed, awn several times longer than the spikelet glabrous, palea minute.

WESTERN TEMPERATE HIMALAYA, alt. 5500–8000 ft., from Simla, *Huegel*, to Kumaon, *Strachey & Winterb.* (n. 925).

Stem 2–3 ft., leafy, nodes glabrous. *Leaves* 8–18 in., very narrow, more or less hirsute beneath or on both surfaces, tips filiform ; ligule very short, long-bearded. *Spikes* 3–8, rather distant, 3–7 in. long, joints and pedicels rather stout, hairs shorter than the pale brown spikelets ; gl. I chartaceous, shining, tip entire, obtuse or truncate, keels ciliate aculeate above ; II obtuse, glabrous except the ciliate margins, keel smooth ; III lanceolate, ciliate, nerveless ; IV ciliate 3-nerved ; palea broadly ovate, glabrous.—The joints of the rachis are decidedly obliquely truncate. Very near *P. quadrinervis*, of which it may be a variety.

5. **P. Thwaitesii,** *Hack. Monog. Androp.* 163; stems short, leaves chiefly radical very slender subdistichous, spikes 2–3, rachis and pedicels villous with white hairs, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. lanceolate, gls. I concolorous acute 2-nerved, IV linear 2-fid lobes narrow acute, awn more than twice as long as the spikelets, palea minute. P. tristachya, var. *Thw. Enum.* 368; var. distachya, *Trim. Cat. Ceyl. Pl.* 106.

CEYLON ; in swamps, alt. 7000 ft., *Gardner, Thwaites.*

Stem short, lengthened downwards and nodose, above densely clothed for 1–3 in. with subdistichously imbricating leaf-sheaths, 1–2 in. long, which are produced into slender wiry erect convolute leaves 6–12 in. long ; ligule minute. *Spikes* 2–3 in. long. *Gl.* I pale brown to the tip, dorsally concave, margins narrowly incurved ; keels villous ; II lanceolate, acute, keel hairy below scaberulous above ; III linear-lanceolate, acute, convolute, obsoletely 2-nerved, tip ciliate ; IV nearly as long, glabrous ; palea ovate, ciliolate.

6. **P. mollis,** *Hack. Monogr. Androp.* 161 ; spikes usually many, rachis and pedicels villous with very long silvery-white hairs, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. narrowly lanceolate acuminate dorsally flat faintly 2-nerved, IV narrow shortly 2-fid or 2-toothed, awn 3- or more times longer than the spikelet, palea minute. Erianthus mollis, *Griseb. in Goett. Nachr.* 1868, 92. Eulalia mollis, *Munro mss.*

TEMPERATE HIMALAYA ; from Kashmir to Sikkim, alt. 5–8000 ft.

Stem 10–12 in., slender, tufted, leafy chiefly at the base. *Leaves* 2–3 in., narrowly lanceolate ; sheath glabrous or ciliate ; ligule very short, bearded. *Spikes* 3–10, 1–2 in. long, crowded, flexuous, joints and pedicels slender beautifully silvery-silky with very long hairs. *Spikelets* pale ; gl. I thin, villous, hairs much longer than itself, lower half dark brown, upper pale, tip obscurely notched or 2-mucronate ; II subacute, dorsally sparsely hairy, keel smooth, margins ciliate ; III lanceolate, hyaline and ciliate in the upper half, 1-nerved ; IV much shorter, awn very slender ; palea glabrous.—Almost intermediate between *Pollinia* and *Erianthus*, Hack. l. c. 162.

§§ *Spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in.

7. **P. argentea,** *Trin. in Bull. Sc. Acad. Petersb.* i. (1836) 71 ; spikes many, rachis and pedicels villous with silvery hairs, spikelets $\frac{1}{10}$ in. linear-oblong pale, gl. I dorsally flat nerveless membranous above the middle

villous or glabrate below it, IV linear 2-fid, lobes narrow acute, awn several times longer than the spikelet ciliate, palea 0. *Hack. Monogr. Androp.* 162. P. tristachya, *Thw. Enum. Pl. Zeyl.* 368 (*in part*); *Benth. Fl. Austral.* vii. 527. *Duthie Fodd. Grass. N.W. Ind.* 26, t. 53. Eulalia argentea, *Brongn. Voy. Coq. Bot.* 92. Erianthus rufus, *Nees ex Steud. Syn. Gram.* 409 (*partim*). E. hexastachyus, *Hochst. in Hohen. Pl. Ind. Or.* n. 279; *Miq. Anal. Bot. Ind.* ii. 35. E. Roxburghii, *F. Muell. Fragm. Phyt.* viii. 117. E. tristachyus, *Nees in Herb. Strach. & Winterb.* No. 4; *in Hook. & Arn. Bot. Beech. Voy.* 241. Saccharum rufum & tristachyum (*in part*), *Steud. l.c.* 408. Andropogon minutiflorus & hexastachyus, *Steud. l.c.* 379, 380. A. trispicatus, *Schult. Mant.* ii. 452. A. tristachyus, *Roxb. Fl. Ind.* i. 256.—Andropogon, *Wall. Cat.* n. 8811.

Tropical Himalaya, alt. 1–5000 ft., from Kumaon eastwards to the Khasia Hills, Bengal, Behar and southward to Ceylon.—Distrib. Malaya, Australia.

Stem 2–3 ft. high, leafy, or in small specimens leafy at the base chiefly. *Leaves* 12–18 in., rarely $\frac{1}{4}$ in. broad, glabrous or sparsely hairy; ligule very short, bearded. *Spikes* 2–12, $1\frac{1}{2}$–6 in. long, flexuous; rachis and pedicels slender. *Gl.* I thin, pale brown below, pale yellow above the middle; II and III as in *P. hirtifolia*, but IV longer and narrower.—Roxburgh describes this as an annual delicate beautiful species, but most of the specimens appear to be perennial. The very small spikelets resemble those of *P. articulata*.

8. **P. fimbriata,** *Hack. Monogr. Androp.* 164; stems very slender shining, leaves very narrow, spikes 2–4 villous with white hairs, joints very short slender, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I lanceolate truncate nerveless dorsally smooth depressed, keels ciliate, II obtuse, III oblong-lanceolate ciliate, IV narrow 2-fid, awn much longer than the spikelets ciliate, palea very minute or 0.

Western Himalaya, Simla, alt. 7–8000 ft., *Thomson.* Malabar and Concan, *Stocks, &c.* Pegu, *M'Lelland.*

Annual. *Stem* 1–2 ft., internodes much longer than the sheaths, nodes glabrous. *Leaves* 6–10 by $\frac{1}{6}$ in., flaccid, sparsely hairy above; sheath glabrous; ligule a ciliolate ridge. *Spikes* 1–3 in., long-peduncled, flexuous, pale; rachis slender, joints densely villous; gl. I with villous keels above, obscurely 2-toothed; IV with oblong ciliate lobes.—Hackel describes gl. IV. as epaleate, but I find a minute palea. He suspects that *Andropogon conjugatus*, Roxb. (Fl. Ind. i. 255) to be closely allied, but Roxburgh describes his plant as the smallest of the genus, with minute leaves, the two spikes as exactly paired and touching one another; which is not the case in *P. fimbriata*.

†† Basal sheaths of stem villous or woolly.

9. **P. phæothrix,** *Hack. Monogr. Androp.* 168; basal sheaths rusty-tomentose, leaves very slender, spikes 2–4, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in., gl. I broadly or narrowly truncate nerveless or faintly 2-nerved dorsally hispidly villous, IV short deeply 2-fid segments narrow, palea small obovate ciliate. P. Cumingii, *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 106 (*non Nees*). P. argentea, *Balans. in Journ. de Bot.* (*Paris*, 1890) 81. Erianthus, aureus, *Nees in Wight Cat.* n. 1690 (*excl. syn.*); *Steud. Syn. Gram.* (*sub Eul. nepalensis*). E. Cumingii, *F. Muell. Fragm.* viii. 118. E. tristachyus, *Nees l.c.* n. 1691. Andropogon pilosus, *Willd. ex Wight l.c.* 1690. A. brunneus, *Heyne in Herb. Rottl.*

Nilghiri Hills, alt. 6–7000 ft. *Wight*, &c. Ceylon, in the Central Provinces. —Distrib. Tonkin.

Stem 18–24 in., slender; peduncle silky under the panicle. *Leaves* 6–18 in.,

rarely $\frac{1}{6}$ in. broad, acute, short and filiform in some Nilghiri specimens, glabrous or hairy; ligule short, bearded. *Spikes* 1–3 in., stout, dark brown, rather distant, joints about $\frac{1}{2}$ as long as the spikelets. *Spikelets* linear-oblong; gl. I dorsally densely villous chiefly at the sides and above; II tip narrowly truncate, keel obscure hairy about the middle; III as long as I, nerveless, ciliate above the middle; IV half as long, awn stout inserted in the cleft, broadening out and vanishing.—A Tonkin specimen is $3\frac{1}{2}$ ft. with broader leaves and white hairs on the rachis.

10. **P. birmanica,** *Hook. f.*; tall, stout from a very stout rootstock with rusty-woolly basal sheath, leaves narrow glabrous, spikes few 3–6 in. strict erect, rachis stout villous, spikelets $\frac{1}{5}$ in. oblong, gl. I narrowly truncate nerveless, IV very narrow 2-fid eciliate.

Burma; Yomah, *Kurz.*

Rootstock as large as a walnut. *Stem* 4–5 ft., villous below the panicle; nodes pubescent. *Leaves* 10–18 in., smooth, glabrous. *Spikes* closely appressed to the rachis, villous with golden-brown hairs; joints as long as the spikelet, obliquely truncate. *Spikelets* dark brown; gl. I dorsally flat, sparsely villous, sides copiously so, margins rather broadly incurved from base to apex; II narrowly oblong, obscurely keeled, sides villous; III oblong-lanceolate, hyaline, ciliate; IV very small, awn $\frac{2}{3}$ in. long; palea orbicular-ovate, long-ciliate.—Possibly only a very large form of *P. phæothrix,* with a stout rootstock, and rachis of the spikes narrower.

11. **P. speciosa,** *Hack. Monogr. Androp.* 159; tall, stout, basal sheaths clothed with pale yellow-brown wool, leaves narrow usually villously hirsute, spikes 3–5 often very long slender flexuous villous with pale yellow-brown hairs, spikelets $\frac{1}{6}$ in. oblong, gl. I narrowly truncate faintly 4-nerved back and sides villous, IV narrowly 2-fid lobes acute eciliate, awn tortuous and twisted, palea very small suborbicular. Erianthus speciosus, *Debeaux in Act. Linn. Soc. Bord.* xxxii. (1878) 53.—Erianthus, No. 9, *Herb. Ind. Or. Hf. & T.*

Khasia Hills, alt. 5–8000 ft., common. Naga Hills, *Prain.*—Distrib. China.

Stems 3–4 ft., densely tufted, peduncle silky below the panicle. *Leaves* 12–18 by $\frac{1}{6}$–$\frac{1}{3}$ in., densely villously tomentose on both surfaces in the Khasia specimens (var. *heterotricha,* Hack. mss.), tips filiform; ligule a long beard. *Spikes* 3–8 in., joints slender = $\frac{1}{2}$ the spikelet. *Spikelets* with sometimes parti-coloured hairs, those of the callus white or concolorous; gl. I narrowly oblong-lanceolate; II subacute, dorsally sparsely hairy, margins ciliate; III linear-oblong, ciliate; IV shorter, linear-oblong, lobes shorter than the gl.; awn several times longer than the spikelet, vanishing downwards in the gl. *Lodicules* 2-fid, ciliate.—The Naga Hill specimen has glabrous leaves like the Chinese. Closely resembles *P. hirtiflora* and *quadrinervis,* differing in the woolly basal sheaths, colour of hairs of spike, and narrow gl. IV. In Sampson's Chinese specimens preserved at Kew (the plant described by Hackel) the base of the stem is wanting; but in fine ones collected at Ichang by Henry, the basal sheaths are woolly, exactly as in the Khasian plant.

12. **P. velutina,** *Hack. Monogr, Androp.* 169; tall, stout, basal sheaths villous with long silky hairs, leaves narrow glabrous, spikes 3–8 long, villous with long pale yellow-brown hairs, spikelets $\frac{1}{6}$ in. oblong, gl. I narrowly truncate 2-cuspidate 4-nerved, back and sides villous, IV narrowly 2-fid or 2-toothed eciliate, awn tortuous and twisted, palea broadly ovate shortly ciliate.

Khasia Hills, alt. 4–5000 ft. *J. D. H. & T. T., Clarke.*

Except in the silky villous clothing of the basal sheaths of the stem, this hardly differs from glabrous states of *P. speciosa*; but whereas the leaves of *speciosa* are

(as far as has been observed) always hirsutely villous in the Khasia, those of *velutina* are always glabrous. Gl. IV varies in the breadth and depth of its lobes which are obtuse or acute.—Duthie (Grass. N.W. Ind 15) gives this as a N.W. plant, but I have seen no specimens from west of the Khasia Hills.

Sect. II. *Stem* decumbent below. *Leaves* not contracted or petioled on the sheath. Gl. I shorter than II, truncate; II broadly truncate; III absent or present.

13. **P. Cumingii,** *Nees in Hook. Kew Journ.* ii. (1850) 98; leaves short flat, spikes 2–4 distant slender densely villous with red-brown hairs, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. oblong, gl. I dorsally hairy hairs longer than the gl., III 0, IV minute 2-fid, awn very slender 3–4 times as long as the gl., palea minute. *Hack. Monogr. Androp.* 167 (*excl.* var. fulva). *Steud. Syn. Gram.* 373. P. fulva, *var.* leptophylla, *Benth. Fl. Austral.* vii. 526. Andropogon aureo-fulvus, *Steud. l. c.* 373. A. Leschenaultianus, *Decne. Herb. Timor. Descr.* 29.

Upper Gangetic Plain; Moradabad, *Thomson.* Kumaon; at Dehra-dun, *Duthie.* Sikkim Terai, *Clarke.*—Distrib. E. Asia, Malaya, Australia.

Stem 12–18 in., hardly thicker than a sparrow's quill, tufted, decumbent below with ascending leafy branches; nodes sometimes proliferous. *Leaves* 2–4 in., linear-lanceolate, finely acuminate; lower sheaths hairy; ligule 0 or obscure, hairy. *Peduncle* filiform. *Spikes* slender, 1½–2 in., subdigitate; joints villous, shorter than the spikelets. *Spikelets* with a shortly bearded callus; gl. I truncate, often 2-cuspidate, 2-nerved or nerveless, margins and tip ciliate; II longer and broader than I, truncate, keel ciliate above the middle, sometimes shortly awned; III absent in all the specimens which I have examined; IV very variable, narrow with subulate lobes in the Moradabad specimen, most minute and 2-toothed in the Sikkim and Kumaon ones, with lanceolate subulate lobes in Tonkin ones.

14. **P. Ridleyi,** *Hack. in Œster. Bot. Zeitschr.* xl. i. (1891) 7; spikes 3–6 digitate, spikelets $\frac{1}{5}$ in., gl. I broadly truncate entire or 3-toothed densely villous with dark brown hairs shorter than the gl., II cuneate-obovate, III present or absent, IV short linear-oblong abruptly awned, awn twice as long as the spikelet or imperfect, palea minute or 0.

Malay Peninsula; Pahang and Johore, *Ridley, Feilding.*—Distrib. Borneo.

Stem compressed, 6–10 in., creeping below. *Leaves* 6–20 by $\frac{1}{10}$–$\frac{1}{8}$ in., subdistichous, rigid, flat or convolute; sheath glabrous. *Spikes* 1½-2½ in., erect, rather stout, joints and pedicels = ½ the spikelets, stiffly ciliate. *Spikelets* linear-oblong; gls. dark; I ciliate at the truncate apex, dorsally flat; II sub 3-nerved; III if present hyaline, obscurely 3-nerved, with an oblong palea larger than itself; IV half as long as II.—Habit of *P. Cumingii*, but the leaf-sheaths are all glabrous, the spikes fewer digitate much darker coloured, the hairs of gl. I are much shorter and paler.

Sect. III. Leptatherum. *Stem* prostrate or decumbent. *Leaves* conspicuously contracted at the base or petioled; basal sheaths naked. Gl. I often deeply channelled dorsally; III present or absent, empty or male; when absent the palea is sometimes as long as gl. I, hyaline or rigid, faintly 2-nerved or nerveless.

* *Triandrous; anthers long narrow.*

15. **P. eucnemis,** *Nees ex Steud. Syn. Gram.* 409; leaves subpetioled, spikes few or many more or less villous with purple hairs, joints short clavate, spikelets ⅛ in. oblong, gl. I dorsally sulcate truncate keels shortly

ciliate, IV shortly 2-fid, palea minute. *Hack. Monogr. Androp.* 173.—Andropogon, *Wall. Cat.* n. 8812.

BURMA; near Prome, *Wallich*; Popan district, *Collett*; PEGU, *Scott, Kurz.*—DISTRIB. Celebes.

Stems elongate, diffusely branched, stout or slender, smooth, polished; nodes glabrous; sheaths much shorter than the internodes. *Leaves* 2–10 in., from elliptic to lanceolate, acute, tips setaceous, nerves slender, and sheath sparsely hairy; ligule short, ciliate. *Spikes* 6–20, densely fascicled, 3–5 in. long, rather stout, pale; joints half as long as the spikelets, often pyriform, margins densely ciliate with purple hairs. *Spikelets* shining, callus shortly bearded; gl. I truncate, strongly ciliate, dorsally scaberulous; II 2-toothed, shortly awned; III 0, or very slender, ciliate, with a lanceolate acuminate glabrous 2-nerved palea as long as gl. I, triandrous or neuter; IV minute, oblong, acutely 2-toothed; awn very slender $\frac{1}{2}$–$\frac{2}{3}$ in.

16. **P. Stapfii,** *Hook. f.*; branches tall from the distant smooth internodes of a long prostrate stem, leaves elliptic-lanceolate acuminate, spikes erect densely fascicled shortly stipitate thickly softly hirsute with fulvous brown hairs each with imperfect naked spikelets at the base, joints and pedicels very stout hollow, gl. I dorsally flat truncately 2-toothed hirsute all over 5–7-nerved, II dorsally convex hirsute aristulate, III 0, IV minute 2-toothed, awn very slender, palea very small, pedicelled spikelet very small awned.

ARRACAN; on low hills of sandstone at Akyab, *Kurz.*

Stem prostrate and ascending, 12–18 in. long and more, rooting at the lower swollen nodes, as thick as a crow-quill, fistular; internodes 2 in. long, quite smooth; branches 2–3 ft. high, again branched, erect, internodes much longer than the sheaths, the lower of which are open and scarious. *Leaves* 4–6 by $\frac{1}{4}$–$\frac{3}{4}$ in., flat, flaccid, very thin, setaceously acuminate, sparsely hairy, midrib slender, margins smooth; ligule membranous, truncate, ciliate. *Spikes* 2–3 in., erect; joints $\frac{1}{3}$ shorter than the spikelets and nearly as broad as the sessile one, very stout, truncate, plano-convex, hirsute all over the back and sides; pedicel of upper as large as the joint but rather shorter. *Sessile spikelet* concealed between the joint and pedicel, $\frac{1}{6}$–$\frac{1}{5}$ in.; callus short, hirsute; gl. I oblong, flat, sub 2-toothed, 5-nerved, nerves sometimes anastomosing, margins narrowly incurved from base to tip, copiously ciliate; II cymbiform, 1-nerved, 2-toothed; IV and its nerveless oblong palea eciliate; awn = spikelet or longer, very slender, column twisted. *Pedicelled spikelets* = about $\frac{1}{4}$ the sessile, elliptic, shortly hirsute, fem. or neuter, gls. 4. *Basal spikelets* of the spikes smaller than the perfect, sessile, closely appressed to the rachis, sparsely hairy or nearly glabrous, gl. I dorsally more or less channelled.

17. **P. vagans,** *Nees ex Steud. Syn. Gram.* 410; leaves sessile, spikes 3–5, joints slender shortly ciliate, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. linear-oblong, gl. I obovate-oblong dorsally sulcate glabrous ciliate, IV very minute 2-toothed, awn twice as long as the spikelet, palea minute toothed. *Hack. Monogr. Androp.* 173.—Andropogon, *Wall. Cat.* n. 8807 B.

NEPAL, *Wallich.*

Stem laxly branched, slender, glabrous. *Leaves* 2–4 in., very narrow, setaceously acuminate, scaberulous, glabrous. *Spikes* very slender, rachis glabrous. *Spikelets* reddish, callus shortly bearded; gl. I chartaceous, dorsally smooth; II membranous, subacute, keel above and margins ciliate; III usually 0, if present male or neuter; palea larger than its gl., oblong, obtuse, rather shorter than gl. I, membranous, 2-nerved, ciliate; IV smaller than its small subquadrate 3–4-toothed palea.

18. **P. grata,** *Hack. Monogr. Androp.* 175; nodes of stem pubescent, leaves sessile, spikes few or many densely fascicled, joints subclavate

shortly densely ciliate, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. oblong. gl. I dorsally channelled keels rigidly ciliate towards the truncate or 2-toothed tip, II mucronate or aristulate, III 0, palea ovate-lanceolate bisexual ciliate, IV minute 2-toothed, awn long or short, palea small ovate. P. ciliata, *Nees in Pl. Meyen.* 186. ?P. montana, *Nees ex Steud. Syn. Gram.* 409. Ephebopogon, gratus, *Nees mss. ex Hack. l. c.*

Sikkim Himalaya, the Khasia and Mishmi Hills, alt. 1–5000 ft., *Griffith*, &c.—Distrib. Java, China.

Stem rather stout, 3–5 ft., pubescent or scaberulous below the nodes. *Leaves* 4–8 by $\frac{1}{3}$–$\frac{2}{3}$ in., linear, setaceously acuminate, scaberulous and sparsely hairy; sheath bearded at the nodes; ligule obscure. *Spikes* $2\frac{1}{2}$–4 in., pale or dark, joints = $\frac{2}{3}$ spikelet, rather longer than the pedicels; gl. I dorsally smooth or scaberulous.—This resembles *P. eucnemis* more than any other species, but has more numerous and darker spikes with more slender joints, and the nodes are pubescent. In some spikelets I find no gl. III or its palea, only an ovary and the ciliate palea of gl. IV.

?Var. *hirsuta*; leaves $\frac{1}{4}$ in. broad pubescent, sheath clothed with very long spreading and reflexed hairs, gl. IV all but reduced to the awn. Pegu, *Kurz.*

19. **P. ciliata,** *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 306; leaves sessile, spikes very many, joints slender compressed rather shorter than the spikelets shortly ciliate, spikelets $\frac{1}{8}$ in. narrow pale, gl. I lanceolate deeply grooved dorsally keels scabrid below ciliate towards the forked tip, II awned or mucronulate, III 0, palea empty or male, IV minute lanceolate or broader and 2-toothed, awn long or short, palea minute. *Hack. Monogr. Androp.* 176; *Steud. Syn. Gram.* 410. P. Wallichiana, *Nees ex Steud. l. c.*; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 107. P. lancea & laxa, *Nees ex Steud. l. c.* P. tristachya, *Thw. l. c.* 368 (*in part*). Andropogon biaristatus, *Steud. l. c.* 379. A. fasciculatus, *Linn. Sp. Pl.* 1047.—Andropogon, *Wall. Cat.* n. 8815 B, 8822, 8823.—Batratherum, ? *Wall. l. c.* n. 8831 *in part.*

Tropical Himalaya, alt. 2–5000 ft., from Kumaon to the Mishmi and Khasia Hills. Behar, on Parusnath, *Clarke.* Nilghiri Hills, *Wight.* Ceylon, *Thwaites.*

Stems 2–4 ft., much branched below, straggling, glabrous or sheaths sparsely hairy; peduncle very slender. *Leaves* very variable, usually small, 1–4 by $\frac{1}{4}$–$\frac{1}{2}$ in., narrowed at both ends, finely acuminate, sometimes petioled. *Spikes* flexuous. Gl. I minutely scaberulous; II sometimes with the awn longer than itself; IV variable, as is its palea, both in breadth and length. *Anthers* very long.—I am puzzled with various forms of the glumes of this plant. Hackel has four varieties: a. *genuina* (P. ciliata, *Trin.*, P. lancea, *Nees*) with linear-oblong spikelets, gl. I entire, keels pectinately ciliate, II mucronulate, IV 2-toothed long awned;—b. *laxa* (P. laxa, *Nees*) with linear-lanceolate spikelets, gl. I pectinately ciliate, II awned, IV entire long awned;—c. *Wallichiana* (Nees Sp.), spikelets linear-oblong, gl. I entire rigidly pectinately ciliate, II long-awned, IV entire, awn imperfect;—d. *seminuda*, spikelets linear-lanceolate, gl. I bimucronate, keels scabrid, II long-awned, IV entire, awn imperfect.—Ceylon (C.P. 411 in part).

20. **P. monantha,** *Nees ex Steud. Syn. Gram.* 410; very slender, spikes 4–6 slender flexuous joints shorter than the spikelets subclavate, spikelets $\frac{1}{14}$–$\frac{1}{10}$ in., 1-fld., gl. I narrow ciliate dorsally channelled, II truncate apiculate, III 0, IV minute rounded 2-toothed, awn about twice as long as the spikelet, palea very minute ovate. *Hack. Monogr. Androp.* 174. P. miscantha (*error for* monantha), *Herb. Ind. Or. Hf. & T.*—Andropogon, *Wall. Cat.* n. 8819.

Subtropical Himalaya; Garwhal, alt. 5000 ft., *Duthie.* Sikkim Terai,

J.D.H. KHASIA HILLS, alt. 4000 ft., *J.D.H. & T.T.* BURMA, Taongdong, *Wallich*; Rangoon, *M'Lelland*; King's Isld., *Helfer*.

Stems 1–3 ft., nodes naked. *Leaves* 3–6 in., base contracted, flaccid. *Spikes* 3–6, 2–4 in. long, very slender, pale green or yellowish brown; joints compressed, broader upwards, ciliate. *Glumes* usually widely spreading; I subacute or narrowly truncate, keels scaberulous or shortly ciliate above; II with villous margins towards the mucronate or aristulate tip; IV very minute, rounded. *Anthers* linear, half as long as the gl. or more.—Resembles *P. ciliata*, but the spikelets are much smaller.

21. **P. delicatula,** *Hook. f.*; stem very slender vaguely geniculately branched leafy, leaves linear-lanceolate acuminate base very narrow, spikes 3–5 fascicled slender pale, joints linear, margins shortly ciliate, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in., callus stellately bearded, gl. I thin linear-oblong truncate dorsally convex shining, keels ciliate above the middle, II apiculate keel ciliate, III 0, IV awn simple or minutely dilated at the base.

PEGU, *M'Lelland, Kurz.*

Stems 1–2 ft., straggling, as thick as a sparrow's quill or less, smooth. *Leaves* $2\frac{1}{2}$–5 by $\frac{1}{4}$–$\frac{1}{2}$ in., flat, thin, sparsely ciliate chiefly towards the base, tip capillary, margins smooth, base a mere point, midrib slender; sheath very slender; ligule minute. *Spikes* 2–$1\frac{1}{2}$ in., erect, flexuous, pale green, joints truncate. *Gl.* I. of sessile spikelet 0–5-nerved, tip more or less 2-toothed; II obtuse, 3-nerved; IV awn capillary about = the spikelet. *Pedicelled spikelet* like the sessile or reduced, awned or not, male or neuter. *Stamens* 3, imperfect only seen, filaments short.

*** Triandrous, anthers minute, filaments very long.*

22. **P. imberbis,** *Nees ex Steud. Syn. Gram.* 410; stem very slender grooved, spikes solitary or few and racemose very slender, joints compressed, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. lanceolate, gl. I narrow subtruncate keels minutely scabrid, II acute nearly glabrous, III-0, IV minute ovate-lanceolate, palea ovate, awn short. *Hack. Monogr. Androp.* 177; *Duthie Grass. N.W. Ind.* 16. P. japonica, *Franch. & Sav. Enum. Pl. Jap.* ii. 608 (*non Miq.*). P. Willdenowiana, *Benth. in Journ. Linn. Soc.* xix. (1881) 67. Andropogon vimineus, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1883) 268. Microstegium Willdenowianum, *Nees ex Steud. l.c.* 411.—Arthraxon, *Wall. Cat.* n. 8838.—Batratherum? *Wall. Cat.* n. 8832.

TEMPERATE HIMALAYA; Simla, *Gamble*; Nepal, *Wallich*; Sikkim, alt. 4–7000 ft., *J.D.H., Clarke.* KHASIA HILLS, alt. 4–5000 ft.—DISTRIB. China, Japan.

Leaves narrowed to the base, flaccid, smooth or subscaberulous. *Spikes* 1–3 in., not fascicled, green, joints more or less ciliate, hardly clavate; callus naked; gl. I concave dorsally, 2–6-nerved, nerves sometimes anastomosing; II 1–3-nerved; awn of IV sometimes capillary, and very short (var. *Willdenowiana*, Hack.); sometimes (var. *genuina*, Hack.) it is longer, stouter, with a twisted base.—Very variable in size; small Nepal specimens have filiform stems 6–12 in., with oblong-lanceolate acute leaves an inch long, and solitary spikes; some large Khasian specimens have stouter much branched stems 2–3 ft. long, with acuminate linear-lanceolate leaves 3–6 in. long, and 6–7 spikes.—The minute persistent didymous anthers are those of *Arthraxon*, and differ from those of all other Indian species of *Pollinia*.

**** Diandrous, anthers linear-oblong.*

23. **P. nuda,** *Trin. in Mem. Acad. Petersb. Ser.* ii. (1833) 307; very slender, spikes few racemed very slender, joints slender terete, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. narrowly lanceolate, gl. I bicuspidate very narrow keels scaberulous, II acuminate, III as long as II hyaline ciliate or 0, IV lanceolate, palea

minute truncate, awn short. *Hack. Monogr. Androp.* 178.; *Steud. Syn. Gram.* 410. P. japonica, *Miq. Ann. Mus. Lugd. Bat.* ii. 290. Leptatherum Royleanum, *Nees in Proc. Linn. Soc.* i. (1841) 93; *Franch. & Sav. Enum. Pl. Jap.* ii. 609.—Batratherum? *Wall. Cat.* n. 8831 *in part.*

Temperate Himalaya; from Chamba to Upper Assam, alt. 4–7000 ft. (to 10,000 in Kumaon), Khasia Hills, alt. 4–5000 ft., *Griffith*, &c.—Distrib. China, Japan, S. Africa.

Stem 2–3 ft., grooved. *Leaves* 1–4 in., lanceolate, very variable in breadth, acuminate, flaccid; sheath hairy; ligule glabrous. *Spikes* 3–5, rarely more, 1–4 in. long, flexuous, green; joints longer or shorter than the spikelets, glabrous or ciliolate. *Spikelets* sometimes distant, callus nearly naked or villous; gl. I rarely truncate or obtuse, often strongly forked, dorsally concave, glabrous or most minutely scaberulous, margins rarely ciliate; II nearly glabrous; III if present narrow, glabrous or sparsely ciliate, nerveless; IV variable in size, never = ½ III, 3-nerved.

EXCLUDED SPECIES.

P. japonica, *Benth. ex Duthie Grass. N.W. Ind.* 16.—Duthie gives this grass which is no doubt *Eurianthus fulvus*, as a native of the Panjab and N.W. Himalaya up to 9000 ft. I find no authority for the name. *P. japonica*, Franch. & Sav. is *P. imberbis*, Nees, and *P. japonica*, Miq. is *P. nuda*; both are Japanese and Himalayan plants. There is also *Eulalia japonica*, Trin. (*Mischanthus sinensis*, Anderss.), which is not Himalayan.

35. **SACCHARUM**, *Linn.*

Tall perennial grasses. *Infl.* a large silky much and densely branched panicle, with spreading at length erect articulate capillary branches and branchlets (spikes). *Spikelets* minute, awnless, 1-fld., binate, a sessile bisexual and pedicelled, fem., rarely both pedicelled and bisexual. *Glumes* 4, all membranous, or I strongly chartaceous, or I and II rarely coriaceous; III empty; IV shortest, rarely 0; palea hyaline nerveless or 0. *Lodicules* cuneate. *Stamens* 3. *Stigmas* laterally exserted. *Grain* oblong.—Species about 12, tropical, chiefly Asiatic.

Sect. I. Eusaccharum. *Rachis* of spike fragile. *Spikelets* of each pair subequal, sessile and pedicelled, both fertile. *Stem* solid.

S. officinarum, *Linn. Sp. Pl.* 54; stem solid glabrous below the panicle, upper leaves long margins scabrid, joints of spikes and pedicels glabrous, hairs of callus about twice as long as the spikelet, gl. I glabrous subchartaceous, IV very narrow or 0, palea small lanceolate. *Roxb. Fl. Ind.* i. 237; *McFad. in Hook. Bot. Misc.* i. (1830) 95, t. 26; *Steud. Syn. Gram.* 405; *Hack. Monogr. Androp.* iii. 111; *Miq. Fl. Ind. Bat.* iii. 507. *Morris in Journ. Linn. Soc.* xxviii. (1890) 197, t. 23. S. sinense, *Roxb. l. c.*

Cultivated in the hotter parts of India.—Native country unknown. For history and cultivation of the sugar-cane in India see Watts' "Dictionary of the Economic Products of India," and for its origin A. de Candolle "L'Origine des Plantes Cultivées."

1. **S. spontaneum,** *Linn. Mant.* ii. 183; stem silky below the panicle, upper leaves long margins smooth, hairs of callus many times longer than the spikelet, gl. I thickened below, IV usually 0, palea ciliate. *Roxb. Fl. Ind.* i. 235; *Kunth Enum. Pl.* i. 475, *Suppl.* 384; *Wight Cat.* n. 1682; *Griff. Notul.* iii. 73, *Ic. Pl. Asiat.* t. 139, f. 63; *Dalz. & Gibs. Bomb. Fl.* 304; *Thw. Enum. Pl. Zeyl.* 369; *Trim. Cat. Ceyl. Pl.* 106.

Aitchis. Cat. Panjab. Pl. 172; *Duthie Grass. N.W. Ind.* 15, *Indig. Fodd. Grass.* 57, *Fodd. Grass. N. Ind.* 25; *Steud. Syn. Gram.* 405; *Hack. Monogr. Androp.* 113; *Anderss. in Œvers. Vet. Akad. Handl. Stockh.* (1885) 156; *Miq. Fl. Ind. Bat.* iii. 512. S. ægyptiacum, *Willd. Enum. Hort. Berol.* i. 82; *Boiss. Fl. Orient.* v. 454. S. bengalense, Boga, Casi, Lola & tenuius, *Herb. Ham. ex Wall. Cat.* n. 8854. S. biflorum, *Forsk. Fl. Æg. Arab.* i. 16. S. caducum, Palisotii & speciosissimum, *Tausch in Flora* (1836) 527; *Steud. l. c.* 406, 405, 407. S. canaliculatum, *Roxb. l. c.* 246; *Wight Cat.* n. 1682; *Duthie Grass. N.W. Ind.* 14; *Steud. l. c.* 406. S. chinense, *Nees in Hook. & Arn. Bot. Beech. Voy.* 241. S. Glaza, *Reinw. ex Blume Gew. Buitenz.* 38. S. insulare, *Brongn. Voy. Coq. Bot.* 99; *Steud. l. c.* 406. S. Klaga, *Jungh. ex Tijdschr. Nat. Gesch.* vii. 296; *Steud. l. c.* (Klagha). S. punctatum, *Schum. Besch. Pl. Guin.* 46. S. propinquum, *Steud. l. c.* S. spontaneum, var. Klaga, *Trin. Fund. Agrost.* t. 15, p. 1–6. S. semidecumbens, *Roxb. l. c.* 236; *Duthie l. c. Steud. l. c.* 406; *Wall. Cat.* n. 8854 A. Imperata spontanea, *Beauv. Agrost.* 8; *Roem. & Sch. Syst.* ii. 289; *Miq. Fl. Ind. Bat.* iii. 512.—Saccharum, *Wall. Cat.* n. 8854.

Throughout the warmer parts of INDIA and CEYLON, ascending to 6000 ft. in the Himalaya.—DISTRIB. S. Europe and warm regions of the Old World. East Australia.

Stem 5–20 ft., erect from a stout rootstock. *Leaves* erect, very long, narrow, margins convolute or incurved; mouth of sheath woolly; ligule membranous. *Panicle* 1–2 ft.; branches whorled, spreading; branchlets fragile; joints filiform, dorsally long-ciliate. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., lanceolate; gl. I 2-nerved; II lanceolate, subkeeled; III ovate-lanceolate, subacute, ciliate; IV very variable.—Hackel recognized two subspecies and several varieties of them.

Subsp. *indicum*; slender, leaves narrow, ligule ovate subacute, spikes slender lax-fld., spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. 4–6 times shorter than the snow-white villi.—All parts of India.

Subsp. *ægyptiacum*; slender, leaves broadly linear, ligule truncate, spikes stouter more dense-fld., spikelets longer $\frac{1}{6}$–$\frac{1}{4}$ in., villi shorter.—Almost confined to Africa, except var. *nepalense*, with spikelets only $\frac{1}{6}$ in.—N.W. India, *Royle* (n. 197).

2. **S. arundinaceum,** *Retz. Obs.* iv. 14; stem glabrous below the panicle, upper leaves long margins hispidly ciliate, joints and pedicels glabrous or ciliate, hairs of callus silky much shorter than the spikelet, gl. I chartaceous acuminate dorsally villous, IV broadly lanceolate. *Kunth Enum. Pl.* i. 475; *Hack. Monogr. Androp.* 117; *Steud. Syn. Gram.* 407. ? S. benghalense, *Retz. l. c.* 16. S. ciliare, *Anderss. in Œvers. Vet. Akad. Handl. Stockh.* (1855) 155; *Hack. l. c.* 118 (*excl. vars.* β. γ.). S. exaltatum, *Roxb. Fl. Ind.* i. 245; *Wight Cat.* n. 1681; *Grah. Cat. Pl. Bomb.* 239; *Steud. l. c.* S. Moonja, *Royle Ill. Himal. Pl.* 416. S. Munja, *Roxb. l. c.* 246. S. procerum, *Roxb. l. c.* 243; *Steud. l. c.*; *Trim. Cat. Ceyl. Pl.* 106; *Duthie Grass. N.W. Ind.* 15. S. Sara, *Roxb. l. c.* 244; *Kunth l. c.*; *Steud. l. c.* 406; *Aitchis. Cat. Panjab. Pl.* 172; *Duthie Grass. N.W. Ind.* 15, *Indig. Fodd. Grass.* t. 50, *Fodd. Grass. N. Ind.* 15; *Boiss. Fl. Orient.* v. 453; *Hack. l. c.* 118; *Wall. Cat.* n. 8853, A. D. S. Surpata, *Hb. Ham. ex Wall. Cat.* 8853 D.—Saccharum, *Wall. Cat.* n. 8852, 8853.—*Rheede Hort. Mal.* xii. t. 46.

Throughout the Plains and low Hills of INDIA. CEYLON, at Colombo, *Trimen.*—DISTRIB. China.

Perennial. *Stem* 10–20 ft. erect from a stout rootstock, branching after the second year. *Leaves* 3–5 ft. by 2–3 in., broadest about the middle, tapering to a slender point, midrib white; sheath bearded about the mouth; ligule short, hairy.

Panicle 1–2 ft., erect, ovoid or oblong; branches half-whorled, clothed with soft cream-colrd. rarely purplish hairs. *Spikes* 1–3 in., rachis capillary. *Spikelets* $\frac{1}{10}$ in., lanceolate, pale green violet or brownish; gl. I dorsally flat or depressed. nerveless except the keels; II lanceolate, shortly acuminate; III oblong-lanceolate; IV mucronate.—Hackel includes under *S. ciliare*, *S. Griffithii*, Munro, which is regarded by Dr. Stapf and myself as an *Erianthus*, gl. IV being clearly awned. *S. benghalense* is a doubtful plant, wanting, according to Hackel, in Retz's Herbarium.

3. **S. Narenga,** *Ham. in Wall. Cat.* n. 8856; stem slender silky below the panicle, nodes bearded, leaves scabrid above uppermost subulate, branchlets of panicle clothed with purple hairs, pedicels clavellate hispidulous, hairs of callus rigid, gl. I coriaceous glabrous or hairy below, II oblong coriaceous tip membranous. *Hack. Monogr. Androp.* 119; *Duthie Grass. N.W. Ind.* 14. Eriochrysis Narenga, *Nees ex Steud. Syn. Gram.* 411; *Aitchis. Cat. Panjab Pl.* 172.—Saccharum, *Wall. Cat. l. c.*

Tropical Himalaya, from Garwhal, alt. 3–4000 ft., to the Khasia Hills, Upper and Lower Bengal, Assam, Silhet, Central India, and Burma.—Distrib. Tonkin, China.

Stem 6–8 ft.; internodes often longer than the sheaths, nodes stellately bearded. *Leaves* 1–2 ft. by $\frac{1}{4}$ in., linear, base narrow, flat; sheath with tubercle-based hairs; ligule rounded. *Panicle* 12–18 in., narrow; rachis scaberulous, bearded at the nodes; branches 2–4-nate, appressed to the fragile rachis, branchlets fascicled. *Spikelets* $\frac{1}{10}$ in., callus minute, hairs longer or shorter than the spikelet; gl. I ciliolate; IV linear-oblong, ciliate.—Hackel has two varieties: *α. genuinum*, Himalayan, with gl. I and II of the sessile spikelet obtuse, glabrous; *β. khasianum*, with the corresponding gl. subacute, densely hairy below.

Sect. II. Sclerostachya (*Anderss.*). *Rachis* of spike tenacious. Both spikelets of each pair pedicelled. *Stem* fistular.

4. **S. fuscum,** *Roxb. Fl. Ind.* i. 236; stem stout silky or villous below the panicle, rachis of panicle villous, spikes nodding, hairs of callus about $\frac{1}{2}$ the length of the oblong or obovoid spikelets, gl. I obtuse, keels ciliate, III and IV ciliate. *Hack. Monogr. Androp.* 121; *Kunth Enum. Pl.* i. 474, *Suppl.* 385; *Steud. Syn. Gram.* 406; *Duthie Grass. N.W. Ind.* 14. S. Modhara, *Ham. in Wall. Cat.* n. 8855 C. Tricholæna? fusca, *Schult. Mant.* ii. 164. Eriochrysis fusca, *Trin. in Mem. Acad. Petersb. Ser.* vi. (1833) II. 315; *Steud. l. c.* 411. E. fusca & attenuata, *Nees ex Steud. l. c.* Miscanthus fuscus, *Benth. in Journ. Linn. Soc.* xix. (1881) 65.—Saccharum, *Wall. Cat.* 8855.

Upper and Lower Gangetic Plains, Assam, the Khasia Hills, the Western Ghats, and Burma.

Stem 5–8 ft. or more, as thick as the little finger. *Leaves* 3–4 ft. by 1–2 in., linear-lanceolate, rigid, glabrous, margins scabrid; margins of sheath fimbriate; ligule rounded. *Panicle* 1–2 ft., narrow, branches whorled or fascicled or subsolitary, nodes bearded; spikes or branchlets nodding, slender, flexuous; joints trigonous, glabrous. *Spikelets* $\frac{1}{8}$ in., brown, upper and lower alike; gl. I entire, margins narrowly inflexed, dorsally flat smooth shining; II subacute, keeled, 1-nerved; III ovate-oblong, obtuse, nerveless, ciliate above; IV like III but shorter, ciliate with rigid hairs; palea much shorter ovate, ciliate. *Grain* obovoid, smooth, brown.

5. **S. Ridleyi,** *Hack. in Œstr. Bot. Zeitschr.* xli. (1891) 6; stem glabrous below the long narrow panicle, rachis of panicle glabrous, spikes erect very long filiform lax-fld., hairs of callus $\frac{1}{3}$ the length of the oblong-

lanceolate spikelets, gl. I 2-toothed keels minutely spinulous, III and IV pectinately ciliate with very long hairs.

MALAY PENINSULA; Pahang, *Ridley*.

Stem several feet high. *Leaves* 2–3 ft. by $\frac{1}{8}$–$\frac{1}{6}$ in., linear, rigid, green, glabrous, margins scabrid; sheath terete, glabrous; ligule very short, truncate. *Panicle* 2 ft. long, erect; rachis angular, subgeniculate at the distant bearded nodes; branches fascicled, very long, filiform; spike 3–5 in., firm, flexuous, lax-fld., glabrous except the bearded axils; joints and pedicels slender, glabrous, terete. *Spikelets* both pedicelled equal and perfect, $\frac{1}{8}$ in. long, yellowish-brown; pedicel of lower = $\frac{1}{3}$ the length of the upper which is about $\frac{1}{3}$ shorter than the joint; gl. I chartaceous, dorsally flat, sides incurved and base sparsely hairy, 2–3-nerved besides the keels; II chartaceous, acute, 3-nerved, sparsely hairy; III nearly equal II, nerveless, margins incurved the long hairs crossing; IV rather shorter, broadly ovate, nerveless, its long hairs up-curved; palea variable, small or minute, ciliate.

DOUBTFUL SPECIES.

S. BRUNNEUM, *Desv. Opusc.* 65, is a species of *Tricholaena*, according to Hackel (Monogr. in Index, p. 707), but as that genus is suppressed and the only Indian plant referred to it is *S. fuscum* (q. v.), it follows that *S. brunneum* may be that plant, and if so Desvaux's name has priority.

36. **ERIANTHUS,** *Michx.*

Habit and characters of *Saccharum*, but gl. IV awned, rarely awnless. —Species about 16, temperate and tropical.

I find no characters whereby to distinguish *Erianthus* from *Saccharum* except that given above, which is all but illusory, and a re-examination of both genera may lead to a better disposition of their species under two or more genera or sections. *Pollinia* differs chiefly in the digitate spikes (see *E. fastigiatus*).

A. Lower branches of the panicle much shorter than the rachis.

* Panicle decompound; ultimate branchlets (spikes) very short, of 3–4 joints; awn of gl. IV short or obsolete.

1. **E. Ravennæ,** *Beauv. Agrost.* 14; leaves flat, ligule very short, panicle oblong, hairs of callus as long as the gls., spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. linear-lanceolate, gl. I membranous lanceolate acuminate tip 2-mucronate keels subspinulosely scabrid, IV rather shorter than I ovate-lanceolate narrowed into a slender awn of its own length or shorter. *Kunth Enum. Pl.* i. 479, *Suppl.* 389; *Hack. Monogr. Androp.* 139; *T. Nees Gen. Fl. Germ. Monocot.* n. 90; *Reichb. Ic. Fl. Germ.* t. 55; *Ledeb. Fl. Ross.* iv. 475; *Boiss. Fl. Orient.* vi. 455; *Duthie Grass. N.W. Ind.* 15, *Fodd. Grass. N. Ind.* 26. E. jamaicensis, *Anderss. in Œvers. Vet. Akad. Handl. Stock.* (1855) 163. Saccharum Ravennæ, *Murray Syst. Ed.* xiii. 88; *Sibth. & Sm. Fl. Graec.* i. 38, t. 52; *Steud. Syn. Gram.* 48. S. jamaicense, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 312. Andropogon Ravennæ, *Linn. Sp. Pl. Ed* II. 1481; *Host. Gram. Austr.* iii. 1, t. 1. Ripidium Ravennæ, *Trin. Fund. Agrost.* 169.

WESTERN HIMALAYA and WESTERN TIBET, alt. 6–9000 ft., from Kashmir to Kumaon, the PANJAB and UPPER GANGETIC PLAIN, from the Indus to Delhi.—DISTRIB. Westward to the Mediterranean.

Stem 6–10 ft., nodes glabrous. *Leaves* 2–3 ft. by 1–1½ in., linear, scaberulous on both surfaces, bearded at the base with golden hairs, margins scabrid; midrib broad;

sheath hairy; ligule silkily villous. *Panicle* 1–3 ft., erect or inclined, greyish-white with silkily villous hairs; spikes (terminal branchlets) about ½ in., joints and pedicels filiform, half as long as the spikelets or more, ciliate with long hairs. *Spikelets* pale; gl. I with one or both margins incurved, nerves 1–3 between the keels; II rather longer, acuminate or aristulate, 3-nerved, keel scabrid; III lanceolate, ciliate, 1-nerved, hyaline; IV glabrous or ciliolate, 3-nerved, rarely awnless; palea shorter, ovate-lanceolate, glabrous. *Pedicelled spikelet*, gl. I strongly 2–3-nerved, villous below as is gl. II.—A very variable grass in stature, colour of the hairs of the panicle, size of the spikelets, and length of the awn.

Var. *purpurascens*, Hack. l. c.; spikelets more or less tipped with violet or purple. E. purpurascens, *Anderss. l. c.* 161.—Common in N.W. India.

2. **E. Griffithii,** *Hook. f.*; leaves very narrow rigid semiterete concave above, ligule long, panicle oblong very pale, callus densely villous with spreading hairs as long as the lanceolate acuminate or acute spikelet, gl. I and II dorsally villous, keels spinulose, IV ovate-lanceolate ciliate narrowed into the short awn. Saccharum Griffithii, *Munro ex Aitchis. in Journ. Linn. Soc.* xix. (1882) 191 (*name only*). S. ciliare, *var.* β. Griffithii, *Hack. Monogr. Androp.* 119. S. Sara, *Aitchis. l. c. ex Hack. l. c.*

Peshawur, *Stewart.* Western Tibet; below Rondu, *Thomson.*—Distrib. Affghanistan, Beluchistan.

Stem tall, tufted, glabrous, solid, as thick as a swan's quill, quite glabrous, pale, polished. *Leaves* 2–3 ft. by ⅛–⅙ in., thickly coriaceous, rigid, quite smooth, dorsally rounded, upper surface concave, margins scaberulous; sheath smooth, polished, shining; ligule long, ciliate with long hairs. *Panicle* 6–12 in., contracted, thyrsiform, inclined, pale yellow when dry; rachis glabrous; lower branches 1–2 in., joints about ½ as long as the spikelets and pedicels villous with long pale hairs. *Spikelets* pale, often tipped with purple; callus hairs about as long as the spikelets, or shorter, white or pale brownish; gls. I and II subequal; I 3-nerved, margins narrowly incurved, scabrid; II rather longer, acuminate; III lanceolate, 1-nerved, hyaline, margins long-ciliate; IV as long as III, 3-nerved, narrowed into a short included or shortly exserted awn; palea much shorter than the gl., more or less ciliate.—Referred to *Saccharum ciliare* (*arundinaceum*) by Hackel, from which the awned gl. IV at once distinguishes it, and much more closely allied to *Erianthus Ravennæ*, differing in the pale straw-colour of its stem, leaves and panicle, rigid ½-terete leaves concave on the upper surface, long ligule, and dorsally hairy gl. I and II. *Griffith, Itinerary Notes,* 317 (n. 1193) describes this as a large grass, 6–7 ft. high, with white spikes, very common at 5000 ft. at Jugdulluk (Affghanistan).

3. **E. elephantinus,** *Hook. f.*; gigantic, leaves broad flat, panicle very large supradecompound, spikelets ⅛–⅒ in., hairs of callus as long as the gls. or longer, grey or purplish, gl I narrowly ovate-lanceolate dorsally sparsely hairy keels scabrid, II lanceolate acuminate subaristate 1-nerved, IV shorter than I ovate-lanceolate 3-nerved eciliate narrowed into a shortly exserted awn.

Assam, *Griffith, Simonds.*

Stem very tall and stout, as thick as the middle finger below the panicle, quite smooth, glabrous. *Leaf* (upper) two or more feet long by ¾ in. broad, quite smooth on both surfaces, margins serrulately scabrid; sheath several feet long; ligule of long straight hairs. *Panicle* 14 in. long, oblong, inclined; rachis as thick as the little finger below, glabrous, polished; lower nodes 4 in. apart, branches numerous, lower fascicled and half-whorled 6–8 in. long. *Spikes* few-fld., capillary, fragile; joints and pedicels half as long as the spikelets or longer, villously ciliate, tops cupular. *Spikelets* ovate-lanceolate, pale; gl. I and II subequal, membranous; I lanceolate, acuminate, tip minutely 2-toothed, dorsally flat, with one median nerve, margins narrowly incurved; II ciliate; III as long as I, hyaline but stiff, 1-nerved, ciliate, margins incurved; IV shorter than III, quite glabrous; palea nearly as long as the

gl., lanceolate from a crowded concave base.—Evidently a gigantic species of which I have seen only one specimen of leaves and panicle from the Calcutta Herbarium, and a scrap of a panicle from Griffith.

** Branches of panicle long simple much or sparingly divided; spikes many-jointed; awn of gl. IV more than twice as long as the spikelet, rarely (in *sikkimensis* and *chysothrix*) shorter or 0.

† Gl. IV entire, narrowed into the awn.

4. **E. fulvus,** *Nees ex Steud. Syn. Gram.* 409; stem silkily villous below the long narrow silkily villous panicle, spikelets $\frac{1}{10}$–$\frac{1}{12}$ in. narrowly oblong much shorter than the fulvous purplish or reddish hairs of the callus, gls. I and II hyaline above the middle, IV very narrow. *Hack. Monogr. Androp.* 147. E. rufipilus, *Griseb. in Goett. Nachr.* (1868) 93; *Duthie Grass. N.W. Ind.* 15. E. japonicus, *Herb. Strach. & Winterb.* n. 2, *& Herb. H.f. & T.* Saccharum rufipilum, *Steud. l.c.*—Erianthus, *Wall. Cat.* n. 8849.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 5–7000 ft. KHASIA and NAGA HILLS, alt. 5–5500 ft.

Stem 6–8 ft., stout; nodes glabrous or pubescent. *Leaves* 2–3 ft. by $\frac{1}{4}$–1 in., flat, glaucous and scaberulous beneath and on the margins; margins of sheath hairy; ligule rounded, ciliate. *Panicle* 8–18 in., erect, decompound; rachis villous; spikes crowded; joints 8–10 and pedicels filiform, villous, half as long as the spikelets or more. *Spikelets* concealed by the hairs of the callus and joints, usually brownish; gl. I chartaceous below, tip suddenly acute, quite entire, 1–3-nerved, dorsally flat, glabrous; margins not incurved or below the tip only, ciliolate above; II rather longer, acute or 2-mucronate, glabrous, margins ciliate; III lanceolate, ciliate, acuminate or shortly awned; IV much shorter, ovate-lanceolate, glabrous, 1-nerved; awn $\frac{1}{4}$–$\frac{1}{3}$ in., palea as long as the gl. or shorter or 0? *Pedicelled spikelets* hardly different from the sessile.—The name *fulvus* is not appropriate.

5. **E. sikkimensis,** *Hook.f.*; stem very slender silkily villous below the very narrow stiff panicle, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. lanceolate longer than the white hairs of the callus, gl. I tip broadly 2-fid sides villous with long hairs hyaline above the middle, IV very narrow.

SIKKIM HIMALAYA; Lachen Valley, alt. 6000 ft., *J. D. H.*

Stem 1–2 ft., as thick as a dove's quill. *Leaves* narrow, rigid, flat, hairy towards the base, margins scabrous; sheaths glabrous or sparsely pubescent above; ligule rounded ciliate. *Panicle* 4–6 in., sparingly branched; spikes strict, erect, appressed to the villous rachis, joints and pedicels nearly as long as the spikelet, glabrous. *Spikelets* erect; gl. I oblong-lanceolate, coriaceous below the middle, dorsally glabrous, sides with long silky hairs, tip bifid with a broad sinus, margins inflexed, keels scabrid, nerves 5 between the scabrid keels vanishing upwards, tips often anastomosing; II chartaceous below the upper hyaline third, keeled, 3-nerved, margins ciliate; III as long as II, thinly chartaceous, 3-nerved, margins incurved ciliate; IV nearly = III, linear-lanceolate, 1-nerved, subciliate, narrowed into a short straight awn; palea nearly = the gl. subulate-lanceolate ciliolate.—Specimens very imperfect.

†† Gl. IV 2-toothed or 2-lobed.

§ *Gl. I. dorsally glabrous or nearly so.*

6. **E. filifolius,** *Nees ex Steud. Syn. Gram.* i. 409; stem pubescent below the narrow panicle, leaves filiform, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. lanceolate rather longer than the hairs of the callus, gl. I of sessile spikelet membranous acute keels scabrid, IV entire or minutely 2-toothed, awn much longer than the spikelet, gl. I of pedicelled spikelet 6–7-nerved. *Hack. Monogr. Androp.*

146. Saccharum filifolium, *Steud. Syn. Gram.* 409; *Duthie Grass. N.W. Ind.* 14.

TEMPERATE WESTERN HIMALAYA, from Chamba to Kumaon, alt. 5-8000 ft., *Royle, &c.*

Stem 2–3 ft., rootstock woody, nodes pubescent. *Leaves* 8–12 in., rigid, glabrous, convolute below, narrowed to the hair, tip capillary; sheath glabrous; ligule very short, obtuse, ciliolate. *Panicle* 6–8 in., red-purple; joints and pedicels = about half the spikelet, ciliate. *Spikelets* surrounded with dense white hairs; gl. I minutely 2-toothed, margins broadly inflexed, dorsally glabrous with 3–4 unequal intracarinal nerves; II like I, 3-nerved, keel smooth; III lanceolate, 2-mucronulate, sub 2-nerved, margins inflexed ciliate; IV shorter, linear-lanceolate, 1-nerved, glabrous; palea short, lanceolate, glabrous.

7. **E. versicolor,** *Nees ex Steud. Syn. Gram.* 409; stem glabrous below the lanceolate panicle, leaves flat, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. linear-lanceolate concealed by the dense white hairs of the callus, gl. I of sessile spikelet variegated chartaceous below reddish and membranous above, keels smooth, IV cuspidately 2-toothed ciliolate, awn twice as long as the spikelet or more, gl. I of pedicelled spikelet 3-nerved between the keels. *Hack. Monogr. Androp.* 144; *Duthie Grass. N.W. Ind.* 16.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 2500–7000 ft.

Stem tall, pubescent below the nodes. *Leaves* 8–16 by $\frac{1}{8}$–$\frac{1}{6}$ in., smooth, margins scabrid; sheath glabrous or mouth sparingly hairy; ligule broadly ovate, glabrous. *Panicle* 8-10 in., rachis and branches opposite, glabrous, axils bearded; joints of spike 5–7 and pedicels $\frac{2}{3}$ as long as the spikelet or longer, shortly ciliate with stiff white hairs. *Spikelets* usually green and violet below the middle, reddish above it; gl. I tip subacute obtuse or 2-denticulate, nerves 2-3 between the keels vanishing upward; II linear-oblong, entire, 1-nerved, keel scaberulous; III linear-oblong nerveless, tip ciliolate; IV = $\frac{1}{4}$ II, cuspidately 2-toothed; palea $\frac{1}{3}$ shorter, linear-lanceolate acute, glabrous.—I very much doubt this being distinct from *E. filifolius* and the following; and amongst the numerous specimens of Himalayan *Erianthi* which I have examined, and which must include these, I find it impossible to refer many with precision to any of these three.

Var. *pallens*, stem slightly pubescent below the pale lanceolate panicle, leaves flat, spikelets $\frac{1}{5}$ in. oblong $\frac{1}{4}$ shorter than the dense white hairs of the callus, gl. I membranous tip hyaline keels smooth, IV cuspidately 2-toothed ciliolate, awn 3–4 times as long as the spikelet, gl. I of pedicelled spikelet shortly 1-nerved between the keels. E. pallens, *Hack. Monogr. Androp.* 145.

8. **E. longisetosus,** *Anderss. ex Benth. in Journ. Linn. Soc.* xix. (1881) 67; stem naked below the ovate-oblong panicle, sessile spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. lanceolate equalling or rather shorter than the red-brown hairs of the callus, gl. I oblong-lanceolate chartaceous bicuspidate 2-nerved between the smooth keels sides sparsely ciliate, IV narrow 2-fid, awn 4 or 5 times as long as the spikelet, gl. I of pedicelled spikelet 6–7-nerved. *Hack. Monogr. Androp.* 143; *Clarke in Journ. Linn. Soc.* xxv. (1889) 85, t. 34. E. mishmeensis, Munro mss.—Erianthus, *Wall. Cat.* n. 8846.

TROPICAL HIMALAYA, alt. 1–3000 ft., from Nepal to the Mishmi, Naga and Munnepore Hills, ASSAM, SILHET and CHITTAGONG.

Stem 6–8 ft., stout, nodes pubescent. *Leaves* 1–3 ft. by $\frac{1}{2}$–$1\frac{3}{4}$ in., glabrous except at the base within, many-nerved, quite smooth, base often much narrowed; sheath smooth; ligule rounded. *Panicle* 6–18 in., of many long densely packed solitary or binate long divided soft drooping spikes clothed with pale reddish or golden-brown hairs, rachis glabrous, joints and pedicels slender about as long as the spikelets densely ciliate with long hairs. *Spikelets* brown below, pale above; gl. I with rather broadly inflexed margins; II oblong-lanceolate, chartaceous, apiculate or

aristulate from a notched tip, 3-nerved, keel smooth, margins villous; III oblong, hyaline, copiously ciliate; IV variable in length, 1-nerved; palea usually half as long as the gl., very narrow.—In *Journ. Linn. Soc. l. c.* the authority for the name *longisetosus* is by oversight given as Thos. Anderson (late Director of the Calcutta Bot. Gardens.)

§§ *Gl. I dorsally villous at the base or all over.*

9. **E. Hookeri,** *Hack. Monogr. Androp.* 142; stem pubescent below the linear-lanceolate panicle, sessile spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. oblong-lanceolate rather longer than the reddish hairs of the callus, gl. I chartaceous acute tip membranous dorsally flat densely villous below the middle, 1-nerved between the scabrid keels, IV obtusely 2-toothed, awn twice or thrice as long as the spikelet, gl. I of pedicelled spikelet 5-nerved villous all over.

Sikkim Himalaya, alt. 1–3000 ft., *J.D.H., Clarke.* Bhotan, *Herb.* Calcutta. —Distrib. Yunan.

Stem 2–3 ft., often branched below. *Leaves* 2–4 ft. by $\frac{1}{3}$–$1\frac{1}{4}$ in.; sheath puberulous, villous at the top; ligule rounded, ciliate. *Panicle* 10–18 in., rachis pubescent, branches short, 2–3-nate; spikes unequal, joints and pedicels = $\frac{1}{2}$ the spikelet, ciliate with long hairs. *Spikelets* rusty red; gl. I villous with white hairs, margins inflexed above the middle, nerves often anastomosing; II oblong, chartaceous, 3-nerved, keel scabrid above; III shorter, lanceolate, nerveless, ciliate, tip dilated; IV awn brown subdorsally inserted; palea minute, long-ciliate.—Very near *E. longisetosus,* and *versicolor*; hardly distinguishable except by gl. I being dorsally villous below the middle.

10. **E. chrysothrix**, *Hack.* in *Œstr. Bot. Zeitschr.* xli. (1891) 6; stem rusty tomentose below the large panicle, spikes long hairy joints villous with rusty hairs, sessile spikelets $\frac{1}{7}$ in. linear-oblong, gl. I chartaceous narrowly truncate, dorsally villous all over, IV oblong 2-fid, awn very short or 0. Saccharum longifolium, *Munro ex Benth. in Journ. Linn. Soc.* xix. (1861) 66. S. fallax β, *Balansa in Journ. de Bot.* (*Paris,* 1890) 81. Eriochrysis longifolia, *Munro mss.*

Khasia and Naga Hills, alt. 2–4000 ft., *Griffith,* &c.—Distrib. Tonkin, Borneo.

Stem 8–10 ft., as thick as the middle finger, solid, smooth. *Leaves* 2–3 ft., glabrous or hirsute; sheaths with tubercle-based hairs; ligule short. *Panicle* 1–2 ft., erect, contracted, dense-fld., sometimes rustily villous; rachis angular, hairy, fragile; spikes whorled, 2–3 in.; joints and pedicels half as long as the spikelet, villous. *Spikelets* brown; gl. I 2-nerved, dorsally flat, keels ciliate; II keeled, truncate, 3-nerved; III shorter, oblong-lanceolate, ciliate; IV = $\frac{1}{2}$ III, ovate or linear-oblong, acutely 2-fid, ciliate; awn in the cleft, $\frac{1}{6}$–$\frac{1}{4}$ in.; palea minute, broad, truncate, ciliate with long hairs.—Very unlike any other Indian species.

B. Lower branches of the panicle almost as long as the rachis.

11. **E. fastigiatus**, *Nees ex Steud. Syn. Gram.* 409; stem silky below the panicle, spikes crowded subdigitately fascicled, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. lanceolate much longer than the white hairs of the callus, gl. I chartaceous purplish-brown base dorsally and margins sparsely villous, keels above aculeolate, IV oblong or lanceolate 2-denticulate, awn terminal as long as the spikelet or longer. *Hack. Monogr. Androp.* 150. Saccharum fastigiatum, *Steud. l. c.*—Saccharum, *Wall. Cat.* n. 8847.

Tropical Sikkim, the Khasia and Mishmi Hills, Assam, Silhet, Chittagong, Chota Nagpore, *Clarke,* Belgaum, *Ritchie.*

Stem 2–8 ft., stout or slender. *Leaves* 1–2 by $\frac{1}{6}$–$\frac{1}{4}$ in., linear from a narrow

base, rigid, flat, smooth, margins scabrid; sheath glabrous, mouth fimbriate; ligule very short, truncate. *Panicle* oblong or fan-shaped; rachis hairy; spikes crowded, lower 3–5 in. strict slender, joints many and pedicels = ½ spikelet or shorter, villous with long white hairs. *Spikelets* dark colrd. below paler above; gl. I dorsally subchannelled, scaberulous, ciliate upwards, 1-nerved between the keels; II chartaceous, lanceolate, margins hyaline, III = I, linear-lanceolate, base membranous coloured, hyaline above; IV = ½ II, hyaline, 3-nerved; palea small, ovate, obtuse, glabrous.—Hardly different from a *Pollinia*.

UNDESCRIBED SPECIES.

E. vulpinus, *Nees in Royle Ill. Pl. Himal.* 417.

37. **ISCHÆMUM,** *Linn.*

Annual or perennial grasses. *Spikelets* usually 2-fld., in solitary digitate or fascicled articulate fragile spikes, binate, a sessile and pedicelled. *Sessile spikelets, Glumes* 4, I oblong or lanceolate, flat, with inflexed margins, truncate or 2-cuspidate, awnless; II as long as I but narrower, concave, acute obtuse or awned; III hyaline, rarely chartaceous, paleate, triandrous, palea narrow ciliate; IV hyaline, bisexual or fem., usually cleft, awned (rarely awnless), awn inserted in the cleft, or by a minute point below it, branching into 3-nerves; palea linear-lanceolate. *Pedicelled spikelet*, like the sessile, or broader, often imperfect. *Lodicules* cuneate-quadrate. *Anthers* linear. *Styles* long, stigmas long or short.—Species about 40, chiefly tropical.

Ischæmum differs from *Pollinia* in the much larger gl. IV. of the sessile spikelet which is usually cleft into lanceolate lobes, and, except in *I. angustifolium*, in the longer palea of that gl. I find that Hackel's sectional character founded on the shape of the joints is unworkable.

Sect. I. EUISCHÆMUM. *Spikes* 2–3, rarely more. *Gl. I* of sessile spikelets dorsally flat, not deeply channelled or depressed along the mesial line. (See also *I. robustum.*)

* Margins of gl. I narrowly inflexed or incurved from base to apex.

† Leaves rounded at the base, sessile on the sheath.

§ *Pedicel of upper spikelet not ⅓ the length of the lower spikelets.*

1. **aristatum,** *Linn. Sp. Pl.* 1049 (*in part*); perennial, leaves sessile long narrow, spikes 2–3 2–5 in., gl. I of sessile spikelet nearly flat oblong obtuse or notched with 2–4 marginal nodules or low transverse ridges, IV deeply 2-fid, awn geniculately inserted at the cleft, upper spikelet dimidiate-ovate. *Kunth Enum. Pl.* i. 512, *Suppl.* 421; *Hack. Monogr. Androp.* 202. I. imberbe, *Retz. Obs.* vi. 35.—Spodiopogon, *Wall. Cat.* 8861 (= vars. *imbricatum* & *elatum*).

Throughout the Plains and lower Hills of INDIA, from Sikkim and Bengal to Burma, and southwd. through the Deccan Peninsula to CEYLON.—DISTRIB. China, Malaya.

Stem 1–4 ft., stout or slender, erect or decumbent at the base, simple or branched above. *Leaves* 4-10 in. by ¼–1½ in., finely acuminate, glabrous or silkily hairy, base rounded or narrowed rarely subpetiolate; sheath naked or hirsute; ligule short or 0. *Spikes* stout or rather slender, internodes much shorter than the spike-

lets, fragile. *Spikelets* $\frac{1}{6}$ to nearly $\frac{1}{3}$ in., pale or dark, glabrous to villous; gl. I from broadly oblong with a rounded tip to oblong-lanceolate, symmetrical or slightly curved or subdimidiate-oblong, upper $\frac{1}{3}$ or $\frac{1}{4}$ usually herbaceous nerved and with a narrow ciliate wing on one or both sides; II acute or acuminate; IV about $\frac{1}{4}$ shorter than II, 3-nerved below the insertion of the slender pale awn, which is rarely twice the length of the spikelet; upper spikelet not awned, pedicel very short.—In Hohenacker's specimen of var. *mangaloricum* gl. IV is cleft $\frac{3}{4}$ way down. In a small form from Salsette (Bombay) Jacquemont n. 374, the keel of gl. II is notched about the middle, winged and serrulate thence to the tip.

The following is Hackel's grouping of some of the more distinct forms of this variable plant. It has the advantage of bringing the authorities and synonyms into some order, but does not include all the definable forms, of which I have added two:—

Subsp. imberbe, *Hack.* l. c. 203; spikelets glabrous, except the callus. I. aristatum, *Burm. Fl. Ind.* t. 21, f. 3 (bad). Meoschium aristatum, *Beauv. Agrost.* 111—Var. *imbricatum*; stout, erect, ligule rather long, gl. I of sessile spikelet 2-nodnled on each side, of pedicelled smooth. Meoschium imbricatum, *Munro mss.* Andropogon imberbis, *Steud. Syn. Gram.* 378. Bengal, the Khasia Hills, Ceylon (CP. 869).—Var. *mangaloricum, Hack. l. c.* 204; stout, erect, ligule short, gl. I of lower spikelet surmounted by a broad scarious claw 3–4-noduled on each side, IV deeply cleft. I. geniculatum, *Hochst. in Hohen. Pl. Ind. Or.* n. 184 (*non Roxb.*) Meoschium Arnottianum, *Nees in Nov. Act. Nat. Cur* xix. *Suppl.* i. (1843) 198. Andropogon geniculatus, *Steud. l. c.*—The Concan and Malabar.—Var. *fallax, Hack. l. c.*; stem slender, base decumbent, ligule minute, gl. I of lower spikelets 3–4-noduled on each side. Meoschium Arnottianum, *Nees in Herb. Wight.* n. 3077. M. monostachys, *Wt. & Arn. ex Steud. l. c.* 369. Andropogon monostachyus, *Steud. l. c.* Central India, the Deccan and Ceylon.

Subsp. barbatum, *Hack. l. c.* 204; spikelets more or less villous, gl. I of lower spikelet 3–4-noduled on each side, the opposite nodules sometimes united by a low ridge. I. barbatum, *Retz. Obs.* vi. 35; *Kunth Enum. Pl.* i. 513. *Benth. Fl. Hongk.* 425; *Thwaites Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107. Meoschium barbatum, *Beauv. Agrost.* 111. Andropogon barbigerus, *Steud. l. c.* 376.—Var. *elatum Hack. l. c.* 205; tall, branched, sheaths hirsute, ligule $\frac{1}{6}$–$\frac{1}{4}$ in. Meoschium elatum, *Nees ex Steud. l. c.* 376. M. Neesianum, *Arn. ex Steud. l. c.* 375. Andropogon, Esenbeckii, and elatus, *Steud. l. c.* 375, 376.

Subsp. Koenigii, *Hook. f.*; tall, very robust, stem as thick as a swan's quill, leaves 1–1½ in. broad, spikes 3 very stout 4 in. long, spikelets ½ in.. gl. I of lower oblong-lanceolate acute, IV shortly 2-fid lobes narrow. I. fasciculatum, *Rottler mss.*—Deccan Peninsula, *Koenig.*—Probably a distinct species.

Subsp. Rottleri, *Hook. f.*; stem stout much branched, spikelets $\frac{1}{5}$ in. closely imbricate, gl. I of lower linear-oblong, of upper very broad broadly winged on one side nerves of both with anastomosing tips, gl. IV of lower cleft nearly to the base, awn inserted in the cleft, of upper oblong bidentate mucronate in the notch. I. barbatum, *Herb. Rottler.*—Probably from the Deccan. This also may be a distinct species.

2. **I. rugosum**, *Salisb. Ic. Stirp. Rar.* i. t. 1; annual, erect, leaves narrow base contracted, spikes 1–2, gl. I subdimidiately oblong obtuse very convex, coriaceous below and closely transversely ridged membranous above, IV cleft to below the middle awn geniculately inserted at the cleft dorsally lobes lanceolate. *Gærtn. f. Fruct. Suppl.* i. t. 181; *Roxb. Fl. Ind.* i. t. 320; *Hack. Monogr. Androp.* 206; *Thwaites Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 31; *Rendle in Journ. Bot.* xxxii. (1894) 103. I. Colladoa, *Spreng. Syst.* i. 298. I. corrugatum, *Herb. Ham. in Wall. Cat.* n. 8864 E. I. Royleanum, *Miq. Fl. Ind. Bat.* iii. 498; *Duthie Grass. N. W. Ind.* 18. I. segetum, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1883) 294. Meoschium Griffithii, *Nees & Arn. in Ann. & Mag. Nat. Hist.* i. (1838) 284. M. Arnottianum, *Nees,*

elegans, *Arn. & Nees*, rugosum, *Nees*, & Wightianum, *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 199, *in Pl. Meyen.* 200. M. Royleanum, *Nees ex Steud. Syn. Gram.* 375. M. rugosum, *Wall. Cat.* n. 8864. M. Wightii, *Nees in Wight Cat.* n. 1719. Andropogon Arnottianus, Griffithsiæ, segetum & Tong-dong, *Steud. l. c.* 375, 376. Apluda rugosa, *Herb. Russ. ex Wall. l. c.* 8864 A. Colladoa distachya, *Cav. Ic.* 37, t. 460.

Throughout INDIA from the Lower Himalaya southwd. to Burma, and the Malay Peninsula, Andaman Islds., and CEYLON.—DISTRIB. China, Malaya.

Stems 1–2 ft., tufted, nodes glabrous or puberulous. *Leaves* 4–10 in.; ligule short. *Spikes* 1–3 in., pale yellow; joints = $\frac{2}{3}$ spikelets, very stout, ciliate. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., pale yellow; gl. I veined in the upper membranous third; ridges of lower $\frac{2}{3}$ often imbricating like folds; II acute, keeled, scaberulous; III lanceolate, acute, hyaline, paleate; IV nearly= II; awn short or long, very slender, glistening, palea ovate-lanceolate. *Pedicelled spikelets* like the sessile, or imperfect.—Hackel has 3 vars., but I fail to limit them with copious suites of specimens. There are, however, two recognizable forms; one with glabrous joints and pedicels, a glabrous or shortly hairy callus, and imperfect awn, the other with more ciliate nodes and pedicels, a more bearded callus and longer awn.

3. **I. magnum,** *Rendle in Journ. Bot.* xxxii. (1894) 102; tall, stout, leaves linear-lanceolate from a narrow base, spikes 2 appressed 4–7 in. nearly glabrous, gl. I of sessile spikelet oblong-lanceolate very coriaceous and deeply transversely channelled below the middle thinner above and 3–5-nerved with one keel narrowly winged, IV ovate-lanceolate entire apiculate awn 0.

SINGAPORE; at Blakan Mate, *Feilding.*

Stem 6 ft., branched above; branches slender, nodes hairy. *Leaves* 12–20 in., finely acuminate, glabrous above, sparsely hairy beneath; sheaths above villous and scabrid; ligule $\frac{1}{6}$–$\frac{1}{4}$ in., 2-auricled. *Spikes* stout, pale; joints 3-gonous, ciliolate on the outer angle, = $\frac{1}{3}$ shorter than the sessile spikelet, tips very shortly bearded; pedicel of upper spikelet very short stout. *Sessile spikelets* $\frac{1}{4}$ in., oblong, convex, pale yellowish polished, tumid between the transverse channels; II coriaceous, acutely keeled, margins incurved; III lanceolate, acuminate, hyaline, 3-nerved, paleate, palea as long 2-nerved; IV rather shorter, hyaline, ovate-lanceolate, 3-nerved; palea as long, narrowly lanceolate, 2-nerved. *Pedicelled spikelet* as long as the sessile, obliquely convolute, inner margin with 2–3 nodules, outer narrowly winged.

4. **I. molle,** *Hook. f.*; tall, stout, branched, leaves sessile, spikes 1–2 stout densely silkily villous with white hairs, joints broad half as long as the spikelets, gl. I broadly ovate-oblong obtuse smooth dorsally villous all over many-nerved, II obtuse silky keel narrowly winged from the middle upwards, IV shorter cleft to the middle, lobes acuminate ciliate, awn geniculately inserted at the cleft. I. aristatum *var.* intermedium, *Hack. mss.*

The CONCAN? *Herb. Dalzell.* CENTRAL PROVINCES; Chanda district, *Duthie.*

Stem 3–4 ft., soft, solid, quite smooth, leafy. *Leaves* 6–10 by $\frac{1}{4}$–$\frac{1}{3}$ in., finely acuminate, base rounded and cordate, sparsely hairy on both surfaces; sheaths 4–6 in., smooth, glabrous or sparingly hairy above, mouth villous. *Spikes* axillary and terminal, 3–5 in.; joints stout, 3-gonous or concavo-convex, ciliate, tips truncate. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in.; callus very short, broad; gl. I thinly coriaceous, margins narrowly incurved obscurely waved at the base; II chartaceous, wing ciliolate, margins ciliate; III hyaline, ovate, obtuse, 3-nerved, ciliate; palea as long, narrower, obtuse, 2-nerved; IV about $\frac{1}{3}$ shorter than III, awn 2–3 times as long as the gls., golden yellow and shining with a brown column; palea like that of III but smaller. *Upper spikelet* smaller than the lower, awnless, pedicel = $\frac{1}{3}$ of lower spikelet.

§§ *Pedicel of upper spikelet* $\frac{1}{3}$ *the length of the lower spikelet or more.*

5. **I. diplopogon,** *Hook. f.*; annual, branching upwards, leaves lanceolate from a narrow base, upper sheaths spathiform, spikes 2 pale, peduncle flexuous, joints dorsally ciliate, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in., gl. I oblong 2-cuspidate glabrous shining, II awned 3-nerved lateral nerves pectinately ciliate with stiff hairs above the middle, IV very short 2-fid lobes acute eciliate awned in the cleft.

BOMBAY; near Bhorkus, *Woodrow.*

Stems 12–18 in. or more, branched from the base and upwards, smooth, stout or slender, internodes long, nodes glabrous. *Leaves* 4–6 by $\frac{1}{4}$–$\frac{2}{3}$ in., acuminate, narrowed from below the middle to the base, dark green, rather shining above, margins smooth, nerves 3–4 pairs and midrib very slender; sheath glabrous, of upper leaves open; ligule very short, glabrous. *Peduncles* many from the upper spathiform sheaths, solitary, filiform; spathes 1–3 in., compressed, lanceolate. *Spikes* 1–1$\frac{1}{2}$ in., compressed; pedicelled spikelets divergent; joints and pedicels = $\frac{1}{2}$ the lower spikelets or longer, subclavate, dorsally rounded, ventrally concave. *Sessile spikelets* white; gl. I nerves obscure, margins narrowly incurved; II dorsally smooth, awn as long as itself; III linear-oblong, 1-nerved, eciliate; IV 3-nerved, awn $\frac{1}{2}$ in. capillary, palea very small, oblong. *Pedicelled spikelets* often imperfect, not awned; gl. I elliptic, 2-cuspidate, green, margins white; II acuminate.

6. **I. Kingii,** *Hook. f.*; annual, leaves ovate-lanceolate base rounded or subcordate, hairy beneath, sheaths of uppermost spathiform, spikes 2 ovate pale villous, joints and pedicels very stout densely ciliate tops 3-lobed, sessile spikelet $\frac{1}{5}$–$\frac{1}{4}$ in., gl. I oblong or oblong-lanceolate 2-cuspidate or 2-aristulate dorsally glabrous shining, sides bulging at about the lower $\frac{1}{3}$ keels ciliate above, II awned dorsally rounded with a broad pencil of stiff hairs on the upper third, IV 2-fid lobes stoutly awned between the lobes.

RAJPOOTANA; Mt. Aboo, *King.*

Stem 10–12 in., ascending, glabrous. *Leaves* 1–2 by $\frac{1}{3}$–$\frac{1}{2}$ in., acuminate, rather thin, margins scaberulous, midrib and nerves very slender; sheaths lax, upper open, glabrous; ligule short, membranous. *Peduncles* sheathed, sometimes up to the spikes, slender. *Spikes* 2 in.; joints shining. *Sessile spikelets* with a short rounded bearded callus; keels of gl. I minutely scaberulous; II scabrid, tip 2-toothed; III lanceolate 1-nerved; IV much shorter, 3-nerved, lobes triangular-ovate, eciliate; palea about as long, ovate-lanceolate, 2-nerved, eciliate; awn about 1 in. long. *Pedicelled spikelets* variable, much smaller; gl. I elliptic, acute, many-nerved, flat, margins not incurved; II shortly awned, dorsally nearly naked.

7. **I. augustifolium,** *Hack. Monogr. Androp.* 241; base of stem woolly, leaves long narrow rigid subpungent, spikes 2–4 on axillary and terminal filiform peduncles, gl. I of sessile spikelet lanceolate 2–3-toothed dorsally convex with a tuft of hairs strongly 3-nerved margins not inflexed, II lanceolate 2-toothed aristulate, IV linear entire or 2-toothed shortly awned. *Oliver in Hook. Ic. Pl.* t. 1773; *Kew Bulletin*, 1888, 157. I. sparteum, *Ham. ex Wall. Cat.* n. 8845. Spodiopogon augustifolius, *Trin. in Mem Acad. Petersb. Ser.* vi. ii. (1833) 300, *Sp. Gram. Ic.* t. 336. S. laniger, *Nees in Royle Ill. Himal. Pl.* 416; *Steud. Syn. Gram.* 373. S. notopogon, *Nees ex Steud. l. c.* Pollinia eriopoda, *Hance in Journ. Bot.* iv. (1866) 173; *Dyer in Journ. Linn. Soc.* xx. (1883) 409. Andropogon binatus, *Retz. Obs.* vi. 21. A. involutus, notopogon & obvallatus, *Steud. l. c.* —Eriantho affine, *Wall. Cat.* n. 8845.

LOWER HIMALAYA; from Kashmir to Sikkim, ascending to 7000 ft. in Garwhal, *Duthie.* The PANJAB. RAJPOOTANA, on Mt. Aboo. The SATPURA HILLS. BEHAR

on Parusnath. CENTRAL INDIA. (Cult. in Bengal, *Kurz.*)—DISTRIB. Affghanistan, China, Philippines.

Stems 2–3 ft., tufted, sparingly branched, slender, grooved on one side, smooth. *Leaves* 1–2 ft. by $\frac{1}{10}$–$\frac{1}{6}$ in., concave or convolute, base obtuse fimbriate, margins scaberulous; sheath glabrous, old basal forming with the wool a thickened mass; ligule a ridge of hairs. *Spikes* 1–2 in., close together or placed apart, erect, golden or rusty villous; joints and pedicels = $\frac{1}{2}$ the lower spikelet, slender, shortly ciliate, bearded at the base. *Spikelets* $\frac{1}{7}$–$\frac{1}{6}$ in., lanceolate, callus hairs short; gl. I subchartaceous, margined with long rufous hairs; II rather longer, 3–5-nerved, ciliate, keel bearded below; III oblong, obtuse, tip ciliate, nerveless, paleate; palea entire or 2-lobed, tip ciliate; IV = II, 1-nerved, awn as long as the spikelet; palea short, ovate, obtuse, tip fimbriate. *Pedicelled spikelets* like the sessile.—Hackel points out that except for the inflorescence this is more a *Spodiopogon* or *Pollinia* than an *Ischæmum*, and should perhaps form a genus. The woolly stem-base recalls *Pollinia velutina* and *phæothrix*.

8. **I. pilosum**, *Hack. Monogr. Androp.* 240; tall, robust, leaves narrow, spikes 2–6 villous, gl. I of sessile spikelet lanceolate bicuspidate translucent dorsally flat or depressed hairy 6-nerved keels scabrid and ciliate, II longer keel ciliate above, IV = III oblong-lanceolate 2-fid, awn short slender inserted between the lanceolate lobes. *Duthie Fodd. Grass. N. Ind.* 31; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 199. Spodiopogon pilosus, *Nees ex Steud. Syn. Gram.* 373; *Wight Cat.* n. 1692. Andropogon pilifer, *Steud. l.c.* A. pilosus, *Klein ex Willd. Sp. Pl.* iv. 920.—Andropogon, *Wall. Cat.* n. 8817.

AJMEER; at Neemuch, *Jacquemont.* CENTRAL PROVINCES, *Duthie.* The DECCAN PENINSULA, *Heyne, &c.*

Stem very stout, extensively creeping; stolons sheathed; branches 2–3 ft., much divided at the base, nodes glabrous. *Leaves* 6–12 in., flat or convolute, often wiry, coriaceous, glaucous, finely acuminate, glabrous, base and mouth of sheath bearded; ligule membranous, rounded. *Spikes* fascicled, $\frac{1}{2}$-$1\frac{1}{2}$ in., yellow or brownish, rachis hairy, joints and pedicels slender, compressed, subclavate, shorter than the sessile spikelets, sparsely ciliate. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in.; callus minute, bearded with long hairs; gl. I chartaceous, narrowed from the middle upwards, dorsally hairy, nerves anastomosing, margins inflexed from base to tip; II rather longer, chartaceous, laterally compressed, acuminate, 5-nerved; III linear-oblong, obtuse, ciliate above, paleate, male, palea glabrous; IV = III, 3-nerved, lobes ciliolate, awn variable in length; palea narrow or broad, ciliate. *Peduncled spikelets* smaller but like the sessile, or imperfect, sometimes reduced to a single gl.

†† Leaves hastate or cordate at the base, often petioled.

§ *Pedicel of upper spikelet not* $\frac{1}{3}$ *the length of the lower spikelet.*

9. **I. semisagittatum**, *Roxb. Fl. Ind.* i. 320; annual, slender, prostrate below, leaves oblong- or linear-lanceolate from a broad cordate or sagittate base, spikes 2 villous or glabrescent, joints very short and stout, gl. I of sessile spikelet oblong obtuse flat glabrous transversely undulate or ridged or margins nodulose, II lanceolate acuminate villous or pubescent, IV cleft to the middle or higher, awn dorsal below the cleft. *Kunth Enum. Pl.* i. 513; *Hack. Monogr. Androp.* 208; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 197. I. conjugatum, *Thw. Enum. Pl. Zeyl.* 365; *Trim. Cat. Ceyl. Pl.* 107; *Hack. l.c.* 205 (*non Roxb.*). Meoschium semisagittatum, *Schult. Mant.* ii. 435. Spodiopogon semisagittatus, *Voigt Hort. Suburb. Calc.* 706. Andropogon semisagittatus, *Steud. Syn. Gram.* 376.

BENGAL, *Roxburgh.* The DECCAN, CONCAN, and CANARA, *Stocks, Talbot.* CEYLON, *Thwaites* (C.P. 3263).

Stem 12–24 in., slender, flaccid, leafy, pale, internodes long, nodes glabrous or hairy. *Leaves* 3–5 in., finely acuminate, flaccid, 3–5-nerved, glabrous or sparsely hairy, margins smooth, costa slender, lower with a filiform petiole ½–1½ in. long; sheaths long, upper often ventricose and open, margins and ligule ciliate. *Spikes* 1–2½ in., more or less villous with white or grey hairs; joints trigonous, clavate. *Sessile spikelets* ⅙–¼ in., gl. I thin, green, dorsally villous, margins narrowly inflexed chiefly below the middle; II lanceolate, acuminate, dorsally rounded; III lanceolate, 1-nerved, paleate; IV glabrous or lobes ciliate, 3-nerved, awn ½–⅔ in.; palea longer than the gl. *Pedicelled spikelets* very shortly broadly pedicelled; gl. I 7–9-nerved, winged above on one side.—I have not seen Huegel's specimens which alone Hackel describes, and for which no habitat is given. The leaf-margins of the specimens I have seen are scarcely "scaberrimæ." Hackel has two vars.: *α. genuinum*, spikelets glabrous, joints dorsally smooth; *β. dasyanthum*, gl. I at least of upper spikelet appressedly villous, joints scabrid with hairy margins and dorsal keel.

Var. *glabrescens*; spikes more slender, joints shortly villous, gl. I shining glabrous transversely undulate below the middle, IV bicuspidate, awn sometimes inserted half-way between the base and sinus, or bipartite and awn geniculately inserted at the cleft.

10. **I. conjugatum,** *Roxb. Fl. Ind.* i. 321; annual, prostrate below, leaves short base hastate or broadly deeply cordate, spikes 2 short villous, joints very short ciliate, gl. I of sessile spikelet oblong obtuse flat 2-toothed villous even or lower margins obscurely nodose, II lanceolate acuminate puberulous, IV cleft to about the middle, awn dorsally inserted at or below the cleft. *Kunth Enum. Pl.* i. 513; *Hack. Monogr. Androp.* 205. Spodiopogon conjugatus, *Voigt Hort. Suburb. Calc.* 706. Andropogon cordatifolius, *Steud. Syn. Gram.* 376.

BENGAL; near Calcutta, *Roxburgh.* The CONCAN, *Stocks.* CEYLON (naturalized) *Trimen.*

Stem spreading from the root and creeping, then geniculately ascending, 12–18 in. high, slender, stiff, purplish, repeatedly branching upwards. *Leaves* 1–1½ in., acuminate, broadest at the base, rather rigid, striate, lower petioled; sheath of the upper ventricose and often open; ligule short, glabrous. *Spikes* 1–1½ in., sessile; joints quadrately clavate, plano-convex. *Spikelets* ⅛ in., pale; gl. I more or less villous from below or above the middle to nearly the top, margins narrowly inflexed not winged, upper half often greener; II strongly keeled, puberulous; III paleate; IV awn slender about twice as long as the spikelet. *Pedicelled spikelets* subsessile, almost awnless; gl. I as in the sessile.—I have seen only Concan specimens, they agree with Roxburgh's character and figure, except in the nodes being hardly villous.

§§ *Pedicel of upper spikelets = ⅓ the length of the lower spikelet, or longer.*

11. **I. commutatum,** *Hack. Monogr. Androp.* 209; slender, prostrate below, leaves short cordate lower petioled, spikes 2, gl. I of sessile spikelet oblong obtuse or acute 2-toothed flat dorsally undulate tip faintly winged margins obscurely nodulose, II acuminate keeled, IV cleft to the middle, awn inserted by a broad base between the ciliate lobes. *Trim. Cat. Ceyl. Pl.* 107. I. semisagittatum, *Thw. Enum. Pl. Zeyl.* 365 (*non Roxb.*).

NILGHIRI HILLS; Conoor, alt. 7000 ft., *Clarke.* CEYLON; Ambagamowa district, *Thwaites* (C.P. n. 2625).

Stem 6–12 in., branching upwards from a decumbent base, nodes glabrous. *Leaves* 1–3 in., linear-lanceolate, acute, softly hairy, margins scabrid; sheath smooth or hairy and keeled above; ligule rounded. *Spikes* 1–1½ in.; joints = about ½ the sessile spikelet, shortly ciliate. *Sessile spikelets* ⅕–¼ in., green or dark-colrd.; callus

bearded; gl. I coriaceous, keels glabrous narrowly winged above; II ovate-lanceolate, keel obtuse smooth; III lanceolate, 3-nerved, paleate; IV shorter, oblong, glabrous, awn ½–⅔ in., palea minute. *Pedicelled spikelets* smaller, awnless; gl. I 5–7-nerved, winged on one side.

12. **I. impressum,** *Hack. Monogr. Androp.* 210; slender, prostrate below, leaves ovate- or oblong-lanceolate cordate lower narrower petioled, spikes 2 villous, gl. I of sessile spikelets linear-oblong flat dorsally broadly irregularly depressed with shallow subsemilunar pits in the lower ⅔ above it winged and 2-cuspidate, II dorsally rounded with a median gibbosity and an auricle-like wing above it, IV cleft to above the middle, awn short geniculately inserted at the cleft.

India, *Huegel.* The Concan? *Herb. Dalzell.*

Stem 4–8 in., quite glabrous, branching upwards. *Leaves* 2–3 in., upper ¾ in. broad, sparsely hairy beneath, margins thickened, scaberulous, sometimes crenulate; sheath compressed, glabrous; ligule oblong. *Spikes* yellow; joints and pedicels stout, clavate, ciliate with rigid hairs, forked at the top. *Sessile spikelets* ¼–⅓ in., shining; callus short, broad, bearded; gl. I narrowed and margins subnodulose at the base, wings erose; II obtuse, chartaceous, ciliate; III oblong-lanceolate, hyaline, 3-nerved, ciliate; IV much shorter, glabrous; awn 1–1¼ in., with very stout column and golden tip; palea oblong, obtuse, glabrous. *Pedicelled spikelets* smaller than the sessile; gl. I obtuse, glabrous, many-nerved, winged on one margin; II 7-nerved; IV mucronate.—I have seen only a fragmentary specimen in Dalzell's Herbarium. The sculpturing of gl. I probably varies.

13. **I. Feildingianum,** *Rendle in Journ. Bot.* xxii. (1894) 101; stem robust branched above, leaves lanceolate cordate, spikes 2 appressed silkily hairy of gl. I, sessile spikelets broadly oblanceolate flat coriaceous and glabrous below the middle hairy above with 6–8 nerves anastomosing at their tips, keels scaberulous, II 6-nerved keeled aristulate, IV deeply 2-fid, awn inserted between the broad obtuse lobes.

Malay Peninsula; Mt. Ophir, *Feilding.*

Upper leaves 4–5 by ½–¾ in., narrowed from the base to the acuminate tip, rigid, pubescent beneath, 16–20-nerved; sheath pubescent; ligule short, truncate. *Spikes* 3–3½ in., erect, fragile, peduncle villous towards the tip; joints and pedicels stout, trigonous, about ¼–⅓ shorter than the spikelet, angles and excised hollow tips long-ciliate. *Sessile spikelets* ¼ in., narrowed to the base; callus cuneiform, densely bearded; gl. I obtuse or 2-toothed, keels very narrowly winged towards the tip; II rather longer than I, scabrid above and narrowed into the short recurved awn; III ovate-oblong, obtuse, hyaline, faintly 3-nerved; palea as long, lanceolate, subchartaceous, with broad rounded hyaline wings; IV hyaline, subscaberulous, awn about ½ in.; palea as long as the gl., lanceolate, 2-nerved. *Pedicelled spikelets* smaller, keels of gl. I winged on one side; IV not awned.

** Margins of gl. I of sessile spikelet broadly incurved below the middle.

† *Keel of gl. II winged above the middle* (*see also* I. murinum).

14. **I. muticum,** *Linn. Sp. Pl.* 1049; glabrous, creeping, branches erect leafy, leaves ovate to lanceolate rigid, spikes 2 short stout glabrous, gl. I of sessile spikelet oblong 2-toothed smooth keels narrowly winged above, II acuminate keel winged above the middle, IV oblong shortly 2-fid shortly awned between the acute ciliate lobes. *Gærtn. f. Fruct. Suppl.* 1, t. 181; *Kunth Enum. Pl.* i. 512; *Hack. Monogr. Androp.* 212; *Wall. Cat.* n. 8865; *Wight Cat.* n. 1716, *Herb.* n. 3078; *Thw. Enum. Pl.*

Zeyl. 364; *Trim. Cat. Ceyl. Pl.* 107; *Benth. Fl. Austral.* vii. 520. I. glabratum, *Presl Rel. Hænk.* i. 328. I. repens, *Roxb. Fl. Ind.* i. 323; *Wight Cat.* n. 1715. Andropogon muticus, polymorphus, relictus & repens, *Steud. Syn. Gram.* 374, 375, 377, 374.

The DECCAN PENINSULA, from Canara southwd. BURMA, the MALAYAN PENINSULA and LACCADINE ISLDS. CEYLON, common.—DISTRIB. China, Malaya, Australia.

Rootstock very stout, creeping for several feet in sand; branches 2–10 in., stout, usually leafy up to the spike; nodes glabrous. *Leaves* 1–6 in., rarely more, sessile or subsessile, flat, stiff, base rounded or cordate, brown when dry; sheath smooth; ligule obscure. *Spikes* 1–1½ in., joints and pedicels stout, 3-gonous, = about half the sessile spikelet, truncate, shortly ciliate. *Sessile spikelets* ⅛–⅙ in., glabrous, callus very large, smooth; gl. I acute, thickly coriaceous, shining, obscurely many-nerved, dorsally ciliate above the middle, margins below broadly incurved; II larger, rigid, glabrous, 5-nerved; III oblong, obtuse, glabrous, palea with a narrow hyaline wing; IV = II, chartaceous, convolute, 5-nerved; palea oblong-lanceolate, keels ciliate. *Pedicelled spikelets* laterally compressed; gl. I with the margin on one side inflexed and broadly winged, concave, hairy; gl. IV usually bisexual.

15. **I. Lisboæ**, *Hook. f.*; stem creeping below, leaves oblong acute and open sheaths villously tomentose, spikes 2 softly tomentose, gl. I of sessile spikelets oblong 2-fid convex keels with broad auricular ciliate wings, II coriaceous scabridly awned keel winged above the middle, IV oblong, obtusely 2-lobed, awn slender inserted between the rounded lobes.

NORTH CANARA, *Lisboa.*

Stem very stout, rooting at the thickened nodes; branches ascending 8–14 in., glabrous. *Leaves* on the creeping stem 1–2 in., closely imbricating in two series, the blades reflexed at right angles to the erect short open sheaths, softly tomentose on both surfaces; lower sheaths ½–1 in., villous; ligule short, bearded with very long hairs. *Spikes* 2 in., joints and pedicels about half as long as the spikelets, stout, concavo-convex, shortly villous, truncate. *Sessile spikelets* ⅛ in., callus very large, glabrous; gl. I thickly coriaceous, dorsally convex, ciliate above the middle, margins broadly incurved below the middle; II rather longer, rigid, dorsally rounded below the wing; III ovate-oblong, obtuse, margins ciliate, paleate, male; palea chartaceous, obovate, 2-nerved, nerves meeting at the tip with very broad hyaline wings above the middle; IV = ⅔ II, 3-nerved below the middle, awn about twice as long as the spikelet; palea lanceolate, nerves ciliate. *Pedicelled spikelets* laterally compressed; gl. I convex, broadly winged, villous; IV shortly awned or awnless.—The habit of the only good specimen I have seen is very peculiar.

16. **I. ciliare**, *Retz. Obs.* vi. 36; erect or decumbent below, leaves linear, spikes 2–3 villous, gl. I oblong or obovate-oblong convex 5–7-nerved 2-lobed or 2-fid from the keels ending in 2 terminal wings, II acuminate or awned dorsally rounded keeled and winged above the middle, IV obovate-oblong cleft to the middle awned in the cleft. *Kunth Enum. Pl.* i. 513 (*excl. syn.*); *Hack. Monogr. Androp.* 225; *Trim. Cat. Ceyl. Pl.* 107; *Wight Cat.* n. 2322. *Duthie Fodd Grass. N. Ind.* 30; *Benth. Fl. Austral.* vii. 520 (*var.*? podostachyum). I. aristatum, *Willd. Sp. Pl.* iv. 939; *Roxb. Fl. Ind.* i. 319. I. barbatum, *Herb. Ham. ex Wall. Cat.* n. 8860 A. I. geniculatum, *Roxb. Fl. Ind.* i. 322. I. scrobiculatum, *Wight & Arn. ex Steud. l. c.* 373. I. tenue, *Herb. Ham. ex Wall. Cat.* n. 8866. Spodiopogon ciliaris, *Nees ex Steud. Nom. Ed.* II. ii. 625; *Wight Cat.* n. 1693. S. obliquivalvis, *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 185, *Thw.*

Enum. Pl. Zeyl. 365; *Wight Cat.* n. 1693; *Wall. Cat.* n. 8588; *Duthie Grass. N.W. Ind.* 16; *Benth. Fl. Hongk.* 426. S. scrobiculatus, *Nees in Wight Cat.* n. 1694, & zeylanicus, *Nees ex Steud. l. c.* 373, 377. S. villosus, *Nees in Hook. & Arn. Bot. Beech. Voy.* 242. Andropogon bifidus, incertus, Macræi, simillimus, patenti-villosus, & Retzii, *Steud. l. c.* 373–377. A. Macræi, *Steud. l. c.* 377. A. malacophyllus, *Hochst. ex Steud. l. c.* 372.—Spodiopogon, *Wall. Cat.* n. 8859, 8860, 8862.

Bengal and the Lower Himalaya, from Nepal to Assam, Silhet and Burma, and southwd. to Travancore, the Laccadine Islds., *Alcock*, and Gt. Cocos Isld., *Prain*. Ceylon.—Distrib. China, Malaya, Australia.

Stem 6 in. 2 ft., stout or slender, tufted, leafy, sometimes creeping; nodes glabrous or bearded. *Leaves* 2–6 in., glabrous pubescent or villous; sheath glabrous or hirsute; ligule short, ciliate. *Spikes* 1½–2 in., rather stout; joints and pedicels = about ½ the spikelets, straight or incurved, ciliate, truncate. *Spikelets* ⅛–⅕ in.; gl. I polished, glabrous or villous, sometimes pitted, upper part scrobiculate or not, terminal wings erose or ciliolate, scaberulous, margins broadly inflexed below; II glabrous, or dorsally ciliate, aristulate; III oblong, 1-3-nerved, ciliate, paleate, male; palea with a chartaceous lanceolate centre, and broad hyaline wings; IV glabrous or ciliolate, awn very slender, about twice as long as the spikelet. *Pedicelled spikelets* rather smaller than the sessile, gl. I acute.—A very common and variable plant, of which Hackel has 3 varieties and 4 Indian subvarieties as follows:—

Var. *α. genuinum*, Hack.; joints and pedicels diverging at the base, spikelets continuous with the callus, gl. IV of pedicelled spikelets usually awned.—1, *prorepens*, stem creeping, branches erect, gl. I not scrobiculate; 2, *scrobiculatum*, habit of *α*, spikelets smaller, gl. I scrobiculate.—3, *malacophyllum*, tall, gl. I broadly winged at the tip, keel of II ciliate.—4, *villosum*; leaves and sheaths villous.

Var. *β. Wallichii*, Hack.; tall, joints and pedicels not divergent at the base, sessile spikelet suddenly constricted at the long bearded callus, gl. IV of pedicelled spikelet imperfectly awned.

Var. *γ. longipilum*, Hack.; joint and pedicels as in *β*. Spikelets glabrous with a long bearded callus, pedicelled spikelet long-awned.

17. **I. heterotrichum,** *Hack. Monogr. Androp.* 220; stem prostrate then ascending, leaves linear-lanceolate from a rounded base, spikes 2 stout erect, gl. I of sessile spikelet rhombic-lanceolate upper part triangular acute dorsally smooth glabrous 4-nerved tip membranous 2-toothed keels broadly winged, II subcoriaceous keel winged above, III ovate 3-nerved, IV shorter broadly oblong shortly 2-toothed awned in the notch. ?Andropogon comorensis, *Steud. Syn. Gram.* 431.

Nicobar Islds., *Jelinek*.—Distrib. Madagascar, Seychelles.

Stem about 20 in. high, slender, compressed, quite glabrous. *Leaves* 2–6 by ⅓–1⅓ in., glabrous or base fimbriate, margins undulate, scabrid, base contracted at the junction with the compressed loose keeled sheath; ligule very short, truncate, ciliate. *Spikes* 2–2¼ in., erect, compressed, joints and pedicels half as long as the spikelet, bearded. *Sessile spikelet* ⅓ in.; callus bearded at the base; gl. I tip membranous 2-toothed, 4-nerved above, margins involute below the middle; II mucronulate, margins ciliolate; III shorter, chartaceous, ovate, acuminate, 3-nerved ciliate, paleate; IV short, ciliolate, awn more or less imperfect confluent with the gl. *Pedicelled spikelets* ¼ in., gl. I winged from below the middle upwards, 7-nerved glabrous.—Descript. from Hackel. In a Seychelle Isld. specimen which I have examined the keel of gl. II is not dorsally winged, and gl. IV is hyaline 5-nerved with lanceolate acuminate ciliate lobes.

†† *Keel of gl. II. not winged* (*or winged* in I. murinum).

18. **I. murinum,** *Forst. Fl. Ins. Austr. Prodr.* 73; slender, erect or prostrate below, much branched, leaves narrowly linear, spikes 2–3 slender villous, gl. I of sessile spikelets oblong acuminate 2-cuspidate or 2-mucronate faintly 5–7-nerved, keels rounded not winged, II long-beaked awned, IV cleft to the middle, awn long stout inserted between the large eciliate lobes. *Kunth Enum. Pl.* i. 571, *Suppl.* 419; *Hack. Monogr. Androp.* 223. Andropogon murinus, *Steud. Syn. Gram.* 377.—Spodiopogon, sp. 9, *Herb. Ind. Or. Hook. f. & T.*

Mysore or the Carnatic, *G. Thomson.*—Distrb. Tanna Isld. (New Caledonia). *Stems* 1–2 ft., very slender, erect or prostrate and geniculate at the base, branching upwards; nodes bearded. *Leaves* 2–4 by $\frac{1}{6}$-$\frac{1}{4}$ in., sessile, flaccid, setaceously acuminate, narrowed to the rounded base, midrib vanishing upwards; sheath scaberulous; ligule oblong, membranous. *Spikes* 1–1½ in., often sheathed by the upper leaves, drying red-brown; joints and pedicels = $\frac{1}{3}$ spikelet, rather slender, trigonous, long-ciliate, tops 3-toothed concave. *Sessile spikelets* $\frac{1}{5}$ in., red-brown, callus long, stout, unilaterally stiffly bearded; gl. I dorsally polished, sparsely ciliate with long stiff hairs above the middle, margins ventricosely incurved below the middle; II longer than I, inserted below it on the callus, dorsally convex, faintly 3-nerved, beak 2-toothed with a long or short very slender awn, keel above shortly winged or not; III male, oblong-lanceolate, acute, 1-nerved, margins incurved; palea as long 2-nerved, nerves convergent in the tip scaberulous with broad hyaline wings, IV = II, female, glabrous, awn dilating at its insertion into a semilunar ridge; palea as long as the gl., ovate, lanceolate, 2-nerved at the base. *Styles* very long, stigmas short. *Pedicelled spikelets* nearly as the sessile.—This species is contained in an extensive Herbarium formed by G. Thomson, Esq. (brother of the late Superintendent of the Calcutta Botanical Gardens). The flowers in each spikelet are strictly unisexual.

19. **I. hirtum,** *Hack. Monogr. Androp.* 228; stout, suberect, leaves long, spikes few or many, gl. I of sessile spikelet lanceolate acuminate or 2-cuspidate 6–9-nerved villous above or glabrate, II aristulate dorsally rounded, IV oblong acutely 2-lobed ciliate awned in the cleft. I. rivale, *Hack. l. c.* Spodiopogon rivalis, *Thw. mss.*

Bengal, Behar and the Khasia Hills, alt. 4–6000 ft. Chota Nagpore and Central India. Nilghiri Hills, alt. 5000 ft. Ceylon; Mateke East, *Beckett.*

Stem 2–3 ft., nodes glabrous or sparsely bearded. *Leaves* 4–8 by $\frac{1}{4}$–1 in., finely acuminate, base narrowed or rounded, glabrous or sheath sparsely hairy; ligule short, ciliate. *Spikes* 2–20, 1–4 in., joints and pedicels subequal, rather slender, trigonous, ciliate. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in.; callus long-bearded; gl. I more or less herbaceous, 6–9-nerved above the middle, margins broadly incurved below; II inserted below I on the callus, sometimes 2-dentate, 3–5-nerved, villous or glabrate; III oblong-lanceolate, acuminate, faintly 3-nerved, ciliate, paleate, male or neuter; palea oblong, centre chartaceous with hyaline ciliate wings; IV ciliolate; awn very slender, $\frac{1}{5}$–$\frac{1}{4}$ in., confluent with the gl., base semilunar; palea as long as the gl. *Pedicelled spikelets* gl. I awned, narrowly winged or not.—The Nilghiri plant is a very tall stout form, with long leaves, and a corymbiform fascicle of more than 20 spikes, its gl. IV is more deeply cleft, and the awn is not produced downwards in the body of the gl.

Hackel, who was not aware how widely spread and variable a species it is, keeps *I. hirtum* and *rivale* as distinct species, thus distinguished:—*I. hirtum*, leaves hirsute on both surfaces, spikes 2–3, gl. I of sessile spikelet entirely chartaceo-herbaceous with 7–9 percurrent nerves, densely hirsute in the upper half.—Khasia Hills. *I.*

rivale, leaves quite glabrous, spikes about 4, gl. I. chartaceous 6–7-nerved in the upper glabrous with the margins sparsely hairy.—Ceylon.

20. **I. timorense,** *Kunth Revis. Gram.* i. 369, t. 98, *Enum. Pl.* i. 512, *Suppl.* 419; slender, decumbent below, leaves sessile and petioled, spikes 2–3 sparingly villous, gl. I ovate or ovate-lanceolate acuminate bicuspidate 5–9-nerved base ventricose, II longer acuminate or aristulate dorsally rounded, IV short 2-lobed awn in the cleft very slender. *Hack. Monogr. Androp.* 229; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 198. I. tenellum, *Roxb. Fl. Ind.* i. 323. Spodiopogon Blumii, *Nees ex Steud. Syn. Gram.* 373. Andropogon Asthenos, *Steud. l. c.* A. timorensis, *Steud. l. c.* 376.—Ischæmum n. 4, *Griff. Notul.* 91, *Ic. Pl. Asiat.* t. 148, f. 1.—Spodiopogon, *Wall. Cat.* n. 8863.

Bengal, *Roxburgh*, Silhet, *Clarke*. Chittagong, *J. D. H. & T. T.* Burma, *Wallich*. Canara and the Central Provinces, *Duthie*, &c. Malayan Peninsula. Ceylon, *Thwaites* (C.P. 963, 3168).—Distrib. Malay and Pacific Islds.

Stem 6–18 in., branched and straggling, nodes glabrous or sparingly bearded. *Leaves* 1–4 in., linear-lanceolate, acuminate, glabrous or sparsely hairy, base of upper rounded, of lower narrowed; sheath lax, mouth hairy; ligule obscure. *Spikes* 1–2 in., rather slender; joints and pedicels about half as long as the spikelet, nearly equal, shortly ciliate. *Sessile spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in., greenish, or with green nerves; callus narrow, long-bearded; gl. I margins broadly involute below, subauricled, dorsally convex, polished, nerves strong; II recurved, 3–5-nerved, tip 2-toothed, dorsally usually ciliate; III lanceolate, paleate, palea linear-oblong; IV glabrous, awn very slender shortly exserted. *Pedicelled spikelets* like the sessile, awned.—A very variable plant, in the form of the leaves especially. Hackel gives four varieties founded on inconstant characters of the leaves and length of the awn. I have little doubt that *I. tenellum*, Roxb., is *I. timorense*. Hackel doubtfully refers it to *ciliare*, of which it has none of the marked characters.

Sect. II. Sehima (Forsk. Gen.). *Spikes* solitary. *Gl. I* of sessile spikelet deeply channelled or depressed along the median line (except *I. notatum*).

21. **I. laxum,** *Br. Prodr.* 205; perennial, leaves linear scaberulous base narrowed, gl. I of sessile spikelet linear-oblong glabrous 2-cuspidate with a broad membranous translucent depression bounded by two strong flexuous submarginal nerves, nodose in the upper half, II awned, IV 2-fid awned between the lanceolate ciliate lobes, *Hack. Monogr. Androp.* 243; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Fodd. Grass. N.W. Ind.* 31, t. 58; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 199; *Benth. Fl. Austral.* vii. 522. I. inscalptum, *Hochst. in Flora* (1844) 247; *A. Rich. Tent. Fl. Abyss.* ii. 472. I. macrostachyum, *Hochst. ex A. Rich. l. c.* I. montanum, *Herb. Russ. ex Wall. Cat.* n. 8818 A. I. nervosum, *Thw. Enum. Pl. Zeyl.* 365. I. Sehima, *Spreng. Syst. Veg.* i. 298. Hologamium nervosum, *Nees in Edinb. N. Phil. Journ.* xviii. (1835) 185; *Wight Cat.* n. 1689. Sehima ischæmoides, *Forsk. Fl. Æg. Arab.* 178. S. Kotschyi, *Hochst. l. c.* S. macrostachyum, *Hochst. in Schimp. Pl. Abyss.* n. 1705. Pollinia striata, *Spreng. Pugill.* ii. 12. Andropogon Brownii, *Kunth Revis. Gram.* i. 163. A. lineatus, Robertianus, Sehima & tacazensis, *Steud. l. c.* 369. A. macrostachyus & inscalptus, *Anderss. in Schweinf. Beitr. Fl. Æthiop.* 310. A. nervosus, *Rottl. in Ges. Naturf. Fr. N. Schrift.* iv. (1863) 218; *Steud. l. c.* A. striatus, *Klein ex Willd. Sp. Pl.* iv. 903; *Br. Prodr.* 201; *Spreng. l. c.* 298. A. schangulensis, *Rupr. in Kotschy Hist. Æthiop.* n. 581; *Steud. l. c.* 369.—Andropogon, *Wall. Cat.* n. 8818.

RAJPOOTANA and the CENTRAL PROVINCES, *Duthie*. The DECCAN, *Heyne*, &c. BURMA, *Wallich*, &c. CEYLON, *Thwaites*.—DISTRIB. eastwd. to Australia, and westwd. to the Cape Verd Islds.

Stems 2–3 ft., tufted on a short stout creeping rootstock, stout or slender, nodes glabrous. *Leaves* 6–10 in., glaucous, tips filiform, nerves strong; sheath ribbed glabrous or hairy; ligule of silky hairs. *Spikes* 2–5 in., erect, pale, joints rather coherent; pedicels rather slender, compressed, 2-angled, ciliate, about half as long as the sessile spikelet. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in., callus shortly bearded; gl. I narrow, nearly flat, nerves very strong especially upwards, those between the lateral irregular in position and length, often anastomosing, margins narrowly incurved; II elliptic, 2-toothed, keel narrowly winged below the slender awn; III linear-oblong or lanceolate, acute, ciliate, palea as long glabrous 2-nerved; IV = $\frac{1}{2}$ III, oblong, 3-nerved, ciliate; awn 1$\frac{1}{4}$–2 in., column stout; palea = the gl., linear-lanceolate, 2-nerved, ciliate. *Pedicelled spikelets*; gl. I ovate-lanceolate, 2-cuspidate, green or purplish, keels narrowly margined, nerves 5–7 very strong scaberulous, lateral pairs close to the margin; II lanceolate, 3-nerved, acuminate; IV awnless.

22. **I. sulcatum,** *Hack. Monogr. Androp.* 248; stem simple or branched from the base, leaves linear or lanceolate scaberulous, base rounded or subcordate, gl. I of sessile spikelet narrowly linear-lanceolate glabrous, tip acuminate 3-cuspidate dorsally convex with a narrow deep median channel margins incurved, nerves obscure, II linear-lanceolate 2-cuspidate awned, IV 2-fid awned between the lobes.

The CONCAN, DECCAN and CENTRAL PROVINCES, &c.

Stems 8–18 in., usually much branched with many solitary terminal spikes, slender, glabrous, nodes glabrous, peduncles very slender. *Leaves* 2–10 in., glaucous, scaberulous above, setaceously acuminate, strongly nerved; sheath slender, smooth; ligule a ciliate membrane. *Spikes* 2–3 in., strict or curved, green; joints and pedicels = $\frac{1}{2}$ the lower spikelet, slender, ciliate, tips obliquely truncate. *Sessile spikelets* $\frac{1}{5}$ in.; callus short, bearded; gl. I scaberulous, tip setiform, keel narrowly margined or winged towards the tip on one side, or simply scaberulous, nerves 2 on each side the furrow; II chartaceous, keel scabrid and margins ciliate above the middle, awn capillary; III = $\frac{2}{3}$ I, hyaline, acute, paleate, ciliate, palea as long truncate; IV linear-oblong, 3-nerved; awn $\frac{3}{4}$–1$\frac{1}{4}$ in., column stout, brown; palea = the gl. 2-nerved. *Pedicelled spikelets* smaller than the sessile, neuter, awnless; gl. I lanceolate, 2-cuspidate, 7-nerved, not channelled, margins incurved, keels margined or winged; II not awned; III as in the sessile spikelet; IV acute not awned.—Varies greatly in habit from a single ascending stem with one spike to a copiously branched one with many spikes. Hackel describes gl. IV of the sessile spikelet as narrowed into the awn, not 2-fid as I find it.

23. **I. ramosissimum,** *Hack. Monogr. Androp.* 249; stem erect excessively paniculately branched, spikes short in leafy panicles glabrescent, gl. I of sessile spikelet linear-oblong very obtuse emarginate 8-10-nerved deeply channelled between the median nerves margins involute not keeled aculeolately ciliate above, II obtuse mucronulate 5-nerved keel scabrid above with a pencil of hairs, III linear obtuse 3-nerved ciliate paleate, IV = II narrowly linear 1-nerved glabrous narrowed into a stout awn.

E. INDIES? *Huegel.*

Stem 3–4 ft. *Leaves* linear-lanceolate, glaucous, glabrous, margins scabrid; ligule chartaceous, truncate. *Spikes* 1–1$\frac{1}{2}$ in., straw-colrd., joints linear, compressed, shortly rigidly ciliate, tips excised. *Sessile spikelets* $\frac{1}{4}$ in. *Pedicelled spikelets* $\frac{1}{2}$–$\frac{1}{3}$ in., linear-lanceolate; gl. I flat acuminate many-nerved; II linear, obtuse, 5-nerved; IV awnless.—The two lowest pair of spikelets are imperfect and awnless. I know nothing of this plant.

24. **I. spathiflorum,** *Hook. f.*; tall, stout, much branched above, spikes enclosed in long narrow spathes very slender, joints and pedicels long, sessile spikelets $\frac{1}{3}$ in. narrowly linear-lanceolate, gl. I of sessile spikelet dorsally deeply channelled densely silkily villous to above the middle, keels rounded scabrid above, II truncate and mucronulate, IV linear-oblong, awn slender inserted between 2 subulate teeth. Trachypogon fasciculatus, *Munro mss.*

BOMBAY; hills of Salsette Isld. in stony places, *Jacquemont* (n. 797).

Stem 3–4 ft., as thick as a goose-quill below, leafy above, branches erect, nodes glabrous. *Leaves* 12–18 by $\frac{3}{4}$ in., finely acuminate, narrowed from the middle to the base, almost petioled, thin, sparsely hairy above and beneath, margins smooth, midrib stout pale, nerves obscure; sheath of lower 6 in. and upwards, terete, quite glabrous, of upper passing into compressed lanceolate flg. spathes 3–4 in. long, which alternate in very slender axillary branchlets, the lower with leafy tips; ligule short, scarious. *Spikes* about 2 in. long, more or less exserted from the spathes, very slender, pale straw-colrd.; joints and pedicels more than half as long as the sessile spikelet, compressed, one angle ciliate. GL. I of *sessile spikelet* white with silky hairs, thinly coriaceous, nerveless, dorsal channel slender transparent forming a ridge ventrally, margins equally involute from base to 2-fid or truncate 2-cuspidate tip; callus very short, bearded; II chartaceous, dorsally convex, nerveless but with a nerve-like fold towards the ciliate margin, keel with long cilia above the middle, scabrid towards the emarginate tip; III shorter, hyaline, oblong-lanceolate, obtuse, 3-nerved, margin above with reflexed hairs; palea lanceolate, 2-nerved, anthers imperfect; IV as long as III, linear, 3-nerved; awn $1\frac{1}{2}$ in., yellow, rather testaceous, palea 0. *Pedicelled spikelets* longer, $\frac{1}{2}$ in.; gl. I dorsally convex (not sulcate), shortly silky, narrowed into a long bisetose glabrous awn.—A very curious species, of which the materials are in rather a young state; it should form a section by itself of *Sehima* were that genus to be restored.

25. **I. notatum,** *Hack. Monogr. Androp.* 246; stems tall tufted, leaves linear narrowed from the base upwards, rigid substrigose, spikes rather stout fragile, gl. I of sessile spikelets oblong, gl. I ovate-oblong glabrous, tip membranous 2-cuspidate dorsally flat with 2 carinal nerves and 2–3 intermediate short green anastomosing ones, keels margined or winged, II 3-nerved shortly awned, IV shorter oblong 2-fid ciliate awned in the cleft.

WESTERN HIMALAYA, alt. 4–7000 ft., from Chamba, *Thomson*, to Kumaon, *Strachey & Winterbottom.*

Stem erect, naked or pubescent below the spike, nodes glabrous. *Leaves* 6–10 by $\frac{1}{8}$–$\frac{1}{5}$ in., setaceously acuminate, green or hoary; sheath bearded at the tip; ligule of long hairs. *Spikes* 3–8 in., strict or curved, fragile, puberulous; joints and pedicels subclavate, half as long as the sessile spikelet, villously ciliate, tips obliquely truncate. *Sessile spikelets* $\frac{1}{3}$ in., callus short bearded; gl. I obliquely ovate-oblong, tip membranous, margins very narrowly inflexed, keels one or both narrowly winged; II chartaceous, entire, 3-nerved, keeled and narrowly winged in the upper third; III oblong, obtuse, ciliate, 2-nerved, palea 2-nerved eciliate; IV 3-nerved, awn $\frac{3}{4}$–1 in.; palea linear-lanceolate. *Pedicelled spikelet*, gl. I lanceolate, acuminate, 2-cuspidate, 7–9-nerved; II lanceolate, acute, glabrous; III as in the sessile; IV awnless.

Sect. III. Spikes few or many, subracemose. *Gl. I* of sessile spikelet deeply or obscurely channelled along the mesian line.

26. **I. petiolare,** *Hack. Monogr. Androp.* 238; tall, stout, leaves long narrowed at the base or petioled, spikes many subpaniculately fascicled, gl. I linear-oblong keels narrowly winged towards the 2-toothed truncate tip dorsally deeply channelled, II cymbiform acuminate or mucronate, IV

cleft to below the middle, awn very short inserted in the cleft. ? *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 198. Spodiopogon petiolaris, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 301. S. Lehmanni, *Griseb. in Goetting. Nachr.* (1868) 91. Pollinia Lehmanni, *Wight & Arn. ex Nees Pl. Meyer*, 186; *Duthie Grass. N.W. Ind.* 16. Andropogon petiolaris, *Steud. Syn. Gram.* 398. ? A. petiolatus, *Dalz. & Gibs. Bomb. Fl.* 303.—*Wall. Cat.* 8807 A.

SUBTROPICAL HIMALAYA, alt. 5–8000 ft., from Garwhal to Nepal. KHASIA HILLS, alt. 4–5000 ft. ? The CONCAN, *Dalzell, Lisboa.* BURMA; Karen Hills, *Kurz.*

Stem 2–3 ft., simple or branched, pubescent below the spikes; nodes pubescent. *Leaves* 8–12 by $\frac{3}{4}$–$1\frac{1}{4}$ in., setaceously acuminate, more or less hairy, margins scabrid; sheath glabrous or margins ciliate; ligule stiff, oblong, truncate. *Spikes* 8–20, $\frac{1}{2}$–$1\frac{1}{2}$ in., simple or divided, rachis glabrous, axils bearded; joints and pedicels flattened, subtrigonous, about as long as the spikelets, shortly ciliate. *Spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in., oblong-lanceolate, pale greenish; callus minute, shortly bearded; gl. I chartaceous, 6–8-nerved to the tip, margins rather broadly inflexed from base to tip; keels scabridly ciliate; II chartaceous, keel scabrid, 3-nerved; III = I, oblong, obtuse, hyaline, ciliate, 3-nerved, paleate, male, palea oblong-lanceolate 2-nerved ciliate; IV = $\frac{1}{2}$ III, glabrous, 3-nerved, lobes acute, awn $\frac{1}{4}$–$\frac{1}{3}$ in.; palea = the gl., lanceolate, 2-nerved, glabrous. *Pedicelled spikelet* like the sessile, but gl. I hardly channelled; III epaleate; IV male.—As Hackel remarks, this has the habit of a *Pollinia* sect. *Leptatherum* (where I should have been disposed to place it) with the spikelets more of an *Ischæmum*. I have seen no Concan specimen.

27. **I. robustum,** *Hook. f.*; tall, stout, leaves long narrow coriaceous softly tomentose on both surfaces, spikes few racemed strict erect, joints very stout obliquely truncate lower minutely puberulous, sessile spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. ovate- or oblong-lanceolate acute coriaceous awnless dorsally flat quite glabrous with 6–9 broad low nerves, keels scabrid above the middle, II coriaceous 7–9-nerved, III 3-nerved paleate male, IV oblong apiculate awnless.

N.W. HIMALAYA; "Pauni, in Bursahir, alt. 7000 ft.," *Brandis* (*Herb. Calcutt.*).

Stem several feet high from a hard rootstock, hard, solid, nearly as thick as a goose-quill, naked below. *Leaves* 12–18 by $\frac{1}{8}$–$\frac{1}{6}$ in., narrowed from the base to the long acuminate tip, sides incurved scaberulous, midrib very stout; sheath long, finely pubescent; ligule a brush of long hairs. *Spikes* 4–5 in., lower stipitate; peduncle stout, glabrous; joints $\frac{1}{3}$ shorter than the spikelets, dorsally rounded, ventrally deeply concave. *Sessile spikelets* quite glabrous, appressed to the rachis, upper in the spike smaller than the lower; callus very short, stout; gl. I sometimes channelled in the middle, very variable in the number and position of the rib-like nerves, tip minutely toothed, margins narrowly incurved; II as long as I, eciliate; III shorter, male; palea, ovate-lanceolate, 2-nerved, eciliate; IV as long as III, rigidly membranous, 3-nerved; palea nearly as long, 2-nerved, both eciliate. *Pedicelled spikelet* $\frac{1}{3}$ smaller than the sessile; gl. I oblong-lanceolate, acuminate, other gls. and palea as in the sessile, but both flg.—Very unlike any other N. Indian species.

DOUBTFUL SPECIES.

I. COROLLATUM, *Nees ex Steud. Syn. Gram.* 369; *Duthie Grass. N.W. Ind.* 18; *Hack. Monogr. Androp.* 252. Andropogon corollatus, *Steud. l.c.*—Mussoorie, *Royle.*

I. HUGELII, *Hack. Monogr. Androp.* 252; annual, glabrous, decumbent and branched below, leaves 1–12 by $\frac{1}{4}$ in. flat flaccid, upper sessile cordate-lanceolate, lower shortly petioled, spike solitary $1\frac{1}{2}$-2 in. rather stout, joints clavate dorsally convex, gl. I of sessile spikelets oblong obtuse coriaceous below with often interrupted ridges about the middle glabrous or dorsally ciliate, margins narrowly inflexed scabrid, II ovate deeply keeled, III oblong hyaline glabrous paleate, IV linear-

lanceolate acute 1-nerved awnless glabrous, palea as long as the gl. *Pedicelled spikelet* awnless, pedicel very short; gl. I linear-lanceolate, flat, acuminate many-nerved.—The Panjab, at Busahir, *Huegel.*—Hackel describes this as very like *I. semisagittatum*, and makes of it a subgenus of *Ischæmum*, characterized by the solitary spike, stout joints, and awnless spikelets, closely connecting *Ischæmum* with *Rottboellieæ*.

I. LONGISPICATUM, *Munro ex Duthie Grass. N.W. Ind.* 18, name only.

38. **EREMOCHLOA,** *Buse.*

Perennial grasses. *Leaves* more or less equitant, rigid. *Spikelets* 1-fld., flat, secund, solitary, sessile at each internode of a terminal narrow compressed spike, with a rudimentary pedicelled. *Glumes* 4, I nearly flat, oblong, smooth, coriaceous, not awned, margins pectinate; II ovate-lanceolate, acuminate, chartaceous, 3-nerved; III hyaline, oblong, obtuse, paleate, male; IV smaller, hyaline, oblong, obtuse, 1-nerved, fem. or bisexual; palea oblong-lanceolate. *Lodicules* obliquely truncate. *Stamens* 3, anthers long. *Stigmas* short, feathery.—Species 8, E. Asia and Australia.

1. **E. muricata,** *Hack. Monogr. Androp.* 262; gl. I broadly ovate-oblong with 2 fan-shaped terminal wings. Ægilops ciliaris, *Koen. in Neue Schrift. Ges. Nat. Berl.* iv. (1810) 210; *Roem. & Sch. Syst.* ii. 772; *Griff. Notul.* iii. 110, *Ic. Pl. Asiat.* t. 158 (*excl.* 4 *upper left-hand figs.*). Æ. muricata, *Retz. Obs.* ii. 27. Ischæmum pectinatum, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 296; *Wall. Cat.* n. 8847; *Thwaites Enum. Pl. Zeyl.* 436; *Trim. Cat. Ceyl. Pl.* 107. I. ciliare, *Nees in Herb. Wight.* n. 1717 (*not of Wight Cat.*). Andropogon pectinatus, *Steud. Syn. Gram.* 369. Rottboellia muricata, *Retz. l. c.* iii. 12.

SOUTH DECCAN PENINSULA, *Koenig*, &c. CEYLON; Trincomalee, *Glenie.*—DISTRIB. Australia.

Quite glabrous. *Stem* 6–18 in., compressed. *Leaves* 3–6 by $\frac{1}{6}$–$\frac{1}{4}$ in., tips rounded apiculate. *Spike* 2–5 in., linear; rachis glabrous, brittle, not excavated. *Spikelets* $\frac{1}{6}$ in.; gl. I nearly orbicular, dorsally slightly convex, many-nerved, wings crenate; spines very many, upcurved, nearly as long as the gl. is broad. *Pedicelled spikelet* a single lanceolate acuminate coriaceous nerved gl. with thin inflexed margins.

2. **E. bimaculata,** *Hack. Monogr. Androp.* 265; gl. I elliptic subacute with 2 small low rounded terminal wings, spines shorter than the gl. is broad. Ischæmum pectinatum, *Benth. Fl. Austral.* vii. 521.

UPPER BURMA; near the Serpentine Mines, *Griffith.*—DISTRIB. Australia.

Habit, &c. of *E. muricata*, but leaves much narrower, narrowed at the obtuse tip; spikes more slender; spikelets much narrower, with fewer nerves and shorter spines, callus puberulous.

3. **E. zeylanica,** *Hack. Monogr. Androp.* 263; gl. I elliptic obscurely winged at the subacute tip, spines longer than the gl. is broad. *Trim. Cat. Ceyl. Pl.* 107. Ischæmum pectinatum, *Wight Cat.* n. 1717. I. falcatum, *Thw. Enum. Pl. Zeyl.* 436.

CEYLON, *Walker, Thwaites* (C.P. 3327). ? DECCAN PENINSULA, *Wight.*

Habit, size of spikelets, &c. as in *bimaculata*, of which it is probably only a variety, differing chiefly in the long spines of gl. I and glabrous callus.

4. **E. leersioides,** *Hack. Monogr. Androp.* 264; gl. I narrowly oblong acute, spines suberect longer than the gl. is broad. Ischæmum leersioides, *Munro in Proc. Amer. Acad.* iv. (1864-5) 363; *Benth. Fl. Hongk.* 425.

PEGU, *Kurz.*—DISTRIB. China, Tonkin.

Very near *E. zeylanica*, but gl. I is smaller and narrower with the long spines of *E. muricata*.

5. **E. Helferi,** *Munro ex Hack. Monogr. Androp.* 266; gl. I broadly ovate subacute, spines longer than the gl. is broad, upper spikelet a scabrid pedicelled bristle. E. ciliatifolia, *Hack. l. c.*

TENASSERIM, *Griffith, Helfer.*

Leaves 4–6 by $\frac{1}{4}$–$\frac{1}{3}$ in. (broader than in the other species), flat, ciliate, tip rounded. *Spike* 1–1½ in. *Spikelets* $\frac{1}{8}$ in.; gl. I 5-nerved, nerves anastomosing above.

39. **POGONATHERUM,** *Beauv.*

Delicate annual or perennial grasses with capillary peduncles. *Leaves* erect. *Spikelets* 1–2-fld., binate (usually a sessile bisexual and pedicelled fem.) imbricate on the fragile rachis of a solitary terminal capillary spike, 2-awned; awns capillary, often interlaced. *Glumes* 4, membranous; I oblong, concave, tip truncate or rounded, long ciliate; II as long as I or rather longer, tip acute or 2-toothed, awn terminal; III (in the upper spikelet 0) hyaline, paleate, male; IV hyaline, narrow, 2-fid, long-awned, palea oblong glabrous. *Lodicules* 0. *Stamens* 1 or 2, anthers long. *Stigmas* slender. *Grain* oblong, free.

The following three species are probably forms of one, being united by many intermediates; they are however for the most part readily distinguishable in India.

1. **P. saccharoideum,** *Beauv. Agrost.* 56, t. 11, f. 7; spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I truncate retuse or tip rounded, II ciliate above the middle, stamens 2 rarely 1. *Thw. Enum. Pl. Zeyl.* 365; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 16, *Fodd. Grass. N. Ind.* 27. P. saccharoideum, *a.* genuinum, *Hack. Monogr. Androp.* 193. P. polystachyum, *Roem. & Sch. Syst.* ii. 497; *Wight Cat.* n. 1679; *Wall. Cat.* n. 8844. Pollinia polystachya, *Spreng. Syst.* i. 288; *Kunth Revis. Gram.* 493, t. 162. Perotis polystachya, *Willd. Sp. Pl.* i. 324. Saccharum paniceum, *Lamk. Encycl.* i. 595, *Illust.* t. 40, f. 31.

Throughout the hilly parts of India, in dry places, from the PANJAB eastward to BHOTAN, MANIPUR and BURMA, ascending the Himalaya to 4000 ft., and southward to CENTRAL INDIA and CEYLON.—DISTRIB. China, Malaya.

Stem 6–18 in. usually densely tufted, nodes glabrous or bearded. *Leaves* 1–3 in. *Spikes* ½–1 in. *Hairs of callus* shorter than the spikelet.

2. **P. crinitum,** *Trin. Fund. Agrost.* 166; spikelets $\frac{1}{14}$–$\frac{1}{12}$ in., gl. I truncate, II glabrous or nearly so, stamens 1 rarely 2. *Kunth Enum. Pl.* i. 478, *Suppl.* 380, *Aitchis. Cat. Panjab. Pl.* 173, *Franch. & Sav. Enum. Pl. Jap.* ii. 189 (*excl. cit. Beauv.*). P. saccharoideum, *var.* β. monandrum, *Hack. Monogr. Androp.* 193. P. polystachyum, *Kunth Revis. Gram.* 493 (*in part*) t. 161. P. refractum, *Nees in Hook. & Arn. Bot. Beech. Voy.* 239; *in Pl. Meyen.* 182. Pollinia monandra, *Spreng. Syst.* i. 288. Pogonopsis tenera, *Presl Rel. Hænk.* i. 133, t. 46. Homoplitis crinita, *Trin. Fund. Agrost.* 166. Ischæmum crinitum, *Trin. in Mem. Acad. Petersb. Ser.* vi. ii. (1833) 298. Andropogon crinitus, *Thunb. Fl. Jap.* 40, t. 7. A. monandrus, *Roxb. Fl. Ind.* i. 260; *Steud. l. c.* 368.—Pogonatherum, *Griff. Notul.* iii. 81, *Ic. Pl. Asiat.* t. 145, f. 2.

Throughout India, extending to the Malay Peninsula, usually at lower elevations and in hotter places than *P. saccharoideum*.—Distrib. Affghan, China, Malaya, N. Hebrides.

A different looking plant from the common form of *P. saccharoideum*, with paler more flexuous squarrose awns, much smaller spikelets, and the hairs of the callus longer than the callus, but intermediates occur, and I could have followed Hackel in uniting them had he included the following.

3. **P. rufo-barbatum,** *Griff. Notul.* iii. 81, *Ic. Pl. Asiat.* t. 145, f. 11; spikelets $\frac{1}{6}$–$\frac{1}{4}$ in., gl. I broadly 2-lobed, III villous above the middle, IV and its palea ciliate, stamens 2. *Hack. Monogr. Androp.* 193. P. majus, *Griseb. in Goett. Nachr.* (1868) 92.

Khasia Hills; by streams, alt. 3–5000 ft., *Griffith*, &c.

Stem 10–24 in.; nodes glabrous. *Leaves* 2–4 in., sometimes $\frac{1}{4}$ in. broad. *Spikes* 1–2½ in.; hairs of callus shorter than the spikelet; gl. I, 2-lobed but hardly 2-auricled (as described by Hackel).—Only, I think, a large form of *saccharoideum* growing in wet places.

40. APOCOPIS, *Nees.*

Annual or perennial grasses. *Leaves* short. *Spikelets* 2-fld. (lower fl. bisexual, upper fem.) solitary or the upper reduced to a pedicel, distichously imbricate on solitary or digitate articulate spikes, dorsally compressed. *Glumes* 4, I broad, cuneiform, coriaceous, many-nerved, tip rounded ciliate; II thinner, truncate, 2-keeled; III narrow, hyaline, paleate; IV hyaline, entire or 2-fid, awned or reduced to an awn dilated at the base; palea very short, convolute, truncate, tip ciliate, or 0. *Lodicules* 0. *Stamens* 2–3. *Styles* very short, stigmas long. *Grain* terete, free.—Species 3–4, Eastern Asiatic.

1. **A. Royleanus,** *Nees in Proc. Linn. Soc.* i. (1894), *et in Ann. & Mag. Nat. Hist.* vii. (1841) 220; perennial, gl. IV oblong 2-fid, awn short or 0. *Hack. Monogr. Androp.* 257; *Duthie Grass. N.W Ind.* 16. Ischæmum paleaceum, *Trin. in Mem. Acad. Petersb. Ser.* 6, ii. (1833) 293; *Sp. Gram. Ic.* t. 333. Andropogon paleaceus & himalayensis, *Steud. Syn. Gram.* i. 376, 377. Ischæmum denticulatum, *Herb. Ham. ex Wall. Cat.* n. 8857.—*Wall. Cat.* n. 8843.

Subtropical Himalaya; alt. 3–4000 ft., from Kumaon to Bhotan. Khasia Hills, alt. 4000 ft. Munnepore, alt. 4–5000 ft., *Watt.*—Distrib. Borneo.

Stem erect, 10–24 in., usually simple. *Leaves* 2–4 in., narrowly lanceolate, acuminate, and sheaths glabrous or softly hairy. *Peduncle* long, slender; spikes 1–2, rarely 3, erect, 1–1½ in.; rachis rusty-villous, brittle. *Spikelets* about $\frac{1}{7}$ in., much longer than the joints; gl. I truncate, dark red-brown with a broad yellow tip; IV awn very slender, included or if exserted not twice the length of the spikelet.

2. **A. Wightii,** *Nees ex Steud. Syn. Gram.* 377; annual, gl. IV linear entire or 2-dentate, awn long. *Wight Cat.* n. 2352; *Hack. Monogr. Androp.* 258; *Thwaites Enum. Pl. Zeyl.* 365; A. Wrightii, *Munro in Proc. Am. Acad.* iv. 363, *et in Benth. Fl. Hongk.* 421. A. Beckettii, *Thw. ex Trim. Cat. Zeyl. Pl.* 107. Amblyachyrum mangalorense, *Hochst. ex Hohenack. Pl. Ind. Or.* n. 231 *& in Flora,* xxxix. (1856) 26.

Behar, Central India, throughout the Deccan Peninsula, Burma, and Ceylon.

Stem tall, erect like *A. Royleanus*, or low and densely tufted. *Leaves* 1–3 in., glabrous or hairy. *Spikes* ½–1½ in., slender or stout. *Spikelets* ⅛–⅕ in.; gl. I yellow with red-brown tips, or dark brown with yellowish tips, glabrous or clothed with red-brown shiny hairs, tips retuse ciliate with minute or long hairs; II 3-nerved or nerveless, sides sharply inflected, angles smooth or scabrid; III nearly = I, tip ciliolate; IV very narrowly oblong or almost linear, awn two to six times as long as the spikelet; palea very short and convolute.—Very variable, and doubtfully separable from *Royleanus* which is stouter with stouter spikes. Wight's original specimen (Cat. n. 2352) is 18–20 in. high, very slender, leafy upwards, with slender pale spikes, and glabrous gl. I; it strongly resembles some specimens of *Royleanus*, and is I suspect perennial. This and a var. *zeylanicus* (*Wightii*, Thw.) with more hairy, darker gl. I, forms Hackel's Subsp. *genuinus*. His Subsp. *mangalurensis* includes short densely tufted states, with shorter red-brown densely hairy and long-ciliate gl. I; it is the common Deccan form, and includes Thwaites' *A. Beckettii*. The difference between the narrow gl. IV of all states of *A. Wightii*, and the much broader hyaline one of *A. Royleanus*, is one of degree only.

Var. *vaginata*; spikes more or less included in the long spathiform sheaths of the uppermost leaves. A. vaginatus, *Hack. in Œstr. Bot. Zeitschr.* xli. (1891) 8.—Hazaribagh, *Clarke*.

3. **A. pallida,** *Hook. f.*; annual, gl. IV reduced to a slender awn.

Nilghiri Hills, *Foulkes*.

Stems slender, stiff, widely creeping and rooting, with short geniculately ascending flg. branches, 2–6 in. high. *Leaves* 1–2 in., linear, acuminate, smooth, sparsely hairy, margins thickened, subscaberulous; sheath open; ligule 0. *Spikes* ½–1 in. ⅛ in. diam., very pale; rachis slender, ciliate. *Spikelets* $\frac{1}{10}$ in.; gl. I broadly cuneiform, ciliate with long hairs, 7–9-nerved; II oblong, obtuse, 3-nerved, lateral nerves submarginal, keels ciliate; III oblong or lanceolate, glabrous, nerveless; IV awn ⅓–1 in., brown, not dilated at the base; palea 0. *Pedicelled spikelets*, gl. I spathulate, truncate, villous, sides recurved; II as in the sessile spikelets.

41. **ARTHRAXON,** *Beauv.*

Annual or perennial slender grasses. *Leaves* short, broad, deeply cordate. *Spikelets* 1-fld., solitary or with a rudimentary pedicelled second, sessile on binate digitate or fascicled jointed spikes. *Glumes* 4, I largest, usually strongly tubercled, not embracing the inner; II keeled, 3-nerved; III small, hyaline; IV shortest, lanceolate, keeled, hyaline, with usually a long dorsal or basal awn; palea minute or 0. *Lodicules* subquadrate. *Stamens* 2–3. *Styles* short or 0, stigmas long, laterally exserted. *Grain* narrowly linear.—Species 8, tropics of Old World.

Sect. I. Pleuroplitis. Joints of rachis of spike rectangularly truncate.

* *Stamens* 3, *anthers large, nearly as long as gl. IV.*

1. **A. lanceolatus,** *Hochst. in Flora*, xxxix. (1856) 188; spikelets linear-lanceolate, gl. I linear dorsally convex smooth margins hyaline inflexed, marginal nerves armed with very strong curved teeth. *Hack. Monogr. Androp.* 347; *Duthie Grass. N.W. Ind.* 17. A. echinatus & serrulatus, *Hochst. l. c.* Batratherum echinatum, *Nees in Edinb. Phil. Journ.* xviii. (1835) 181; *Wall. Cat.* n. 8829; *Aitchis. Cat. Panjab Pl.* 174. B. lanceolatum, *Nees l. c.*; *Wight Cat.* n. 1684. B. serrulatum, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 458. Andropogon echinatus, *Herb. Heyne ex Wall. Cat.* n. 8829; *Steud. Nom. Ed.* II. i. 191; *Edgew. in Journ. As. Soc.*

Beng. xxi. (1853) 182; *Duthie Grass. N.W. Ind.* 16. A. lanceolatus, *Roxb. Fl. Ind.* i. 257; *Kunth Enum. Pl.* i. 498. A. prionodes, *Maxim. in Bull. Soc. Nat. Mosc.* liv. (1879) 68 (*non Steud.*). A. serrulatus, *Link Enum. Hort. Berol.* i. 241; *A. Rich l. c.* Thelepogon elegans, *Roth Nov. Sp.* 62 (*char. fals*), *ex Roem. & Sch. Syst.* ii. 788; *Wight Cat.* n. 1684.—Batratherum, *Wall. Cat.* n. 8830.

Western Himalaya, alt. 5–8000 ft. from Kashmir to Nepal. Plains of the Panjab and Rajpootana. Behar, on Parusnath, alt. 4000 ft., *Clarke.* Coromandel, *Roxburgh.* Sind, *Stocks.*—Distrib. Abyssinia, Tonkin, China.

A tall much-branched suberect or subscandent grass 1–3 ft. high with rigid stems thicker than a crow-quill. *Leaves* very variable, from broadly ovate and ½–3 in. by ¼–1½ in., to narrowly lanceolate and 1–4 by ⅙–½ in., caudate-acuminate, flaccid or rigid, glabrous or hairy, margins serrulate or ciliate with stiff hairs, nerves obscure; ligule rounded. *Spikes* few or many, ½–2 in., rachis sparsely hairy, joints about half as long as the spikelet, margins ciliate. *Spikelets* ⅙–¼ in., very narrow; gl. I acute, tip hyaline 5–7-nerved, dorsally smooth or muriculate; II lanceolate, 3-nerved; III shorter, linear-oblong, acute; IV hyaline, awn about 1 in. long. *Pedicelled spikelets* linear-lanceolate, keels hispidulous; anthers perfect.—Hackel has 5 varieties and subvarieties of this species, but I fail to limit them after studying copious materials.

2. **A. rudis,** *Hochst. in Flora,* xxxix. (1856) 188; spikes few, spikelets ovoid, gl. I ovate acute convex 7-nerved, nerves above armed with a few irregular spinescent tubercles, margins hyaline narrowly incurved IV paleate. *Hack. Monogr. Androp.* 348. Andropogon rudis, *Steud. Syn. Gram.* 383; *Thwaites Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 107. A. castratus, *Griff. Notul.* iii. 89. Batratherum rude, *Nees ex Steud. l. c.*—Arthraxon, *Wall. Cat.* n. 8834, 8837.

Upper Assam; Suddiya, *Griffith.* Silhet, *de Silva.* Ceylon; in the Central Province, *Thwaites* (C.P. 866).

Stem 1–2 ft., erect from a geniculate branched rooting (blood-red, *Griff.*) base, rigid, as thick as a crow-quill or less. *Leaves* 2–4 in., lanceolate, acuminate, glabrous or sparsely hairy, margins strongly ciliate. *Peduncle* long, slender, naked. *Spikes* 1, 2, or few, ½–1 in., peduncled; peduncle and rachis rather stout smooth, with sometimes an empty glume. *Spikelets* ⅙ in. (red-brown, *Griff.*), coriaceous; gl. I 9-nerved; II 3-nerved, acute; III hyaline, oblong, ciliate, 1-nerved; IV lanceolate, ciliate, awn inserted below the middle, about twice as long as gl. II, palea linear-oblong, ciliate.—The only species in which I have seen a palea to gl. IV.

3. **A. breviaristatus,** *Hack. Monogr. Androp.* 350; spikes many, spikelets ovate-lanceolate, gl. I oblong-lanceolate subacute convex nerves 7 pair tubercled nearly to the base, II acute keel ciliate margins with deflexed cilia, awn short. Batratherum khasianum, *Munro mss.* B. echinatum, *Herb. Ind. Or. Hf. & T.* (*in part*).

Khasia Hills, alt. 5000 ft., *Griffith,* &c.

Stems 2–4 ft., geniculately branched below, about as thick as a dove's quill. *Leaves* 1–2½ in., ovate or ovate-lanceolate, finely acuminate and sheaths glabrous or hairy. *Peduncle* long, usually naked, slender. *Spikes* 10–20; 1–3 in.; rachis and pedicels nearly glabrous. *Spikelets* ⅙–⅕ in., purplish; gl. I variable in the number and size of tubercles on the nerves; IV not much shorter than II, awn subbasal, shortly exserted. *Anthers* very large (sometimes 2 only ?)—Resembles a very large *A. ciliaris.*

4. **A. submuticus,** *Hochst. in Flora,* xxxix. (1856) 188; spikes few short pale, spikelets all sessile very small linear-oblong terete, gl. I

7-nerved, nerves more or less muriculate, II acute keel ciliate, IV with a very short included basal awn or 0. A. ciliaris, *Subsp.* 6, submuticus, *Hack. Monogr. Androp.* 356. Batratherum submuticum, *Nees ex Steud. Syn. Gram.* 382; *Duthie Grass. N.W. Ind.* 17. Andropogon submuticus. *Steud. l. c.*—Arthraxon, *Wall. Cat.* n. 8835 B (*in part*) & 8836.

WESTERN HIMALAYA; from Garwhal to Central Nepal, alt. 2–6000 ft., *Wallich*, &c. TAVOY, *Gomez.*—DISTRIB. China, Loochoo Islds.

Annual. *Stems* 6 in.–3 ft., slender, much-branched and rooting below, as thick as a sparrow's quill. *Leaves* ½–1½ in., broadly ovate-cordate, acuminate, and sheaths glabrous or hairy, margins strongly ciliate. *Peduncle* filiform, usually long and naked. *Spikes* 3–5, ½–1 in. long, very slender; rachis quite glabrous, flexuous. *Spikelets* ⅛ in., pale, all sessile (male?). *Stamens* as long as gl. IV.—A puzzling plant, and possibly the male of an unrecognized form of *ciliaris* from which species it differs in the 3 stamens as long as gl. IV, as well as in the minute flowers, and usually the want of an awn, though a very short one is sometimes present. One very long specimen (Herb. J. S. Lace) has besides the terminal naked peduncle, very short sheathed lateral ones.

5. **A. spathaceus,** *Hook. f.*; slender, panicles (always?) in long spathiform narrow sheaths, spikes few, spikelets oblong-lanceolate, gl. I of sessile spikelet oblong-lanceolate 5–7-nerved, nerves covered throughout their length with a row of acute tubercles, awn of gl. IV dorsal.—Batratherum, *Herb. Wight* n. 3257.

DECCAN PENINSULA; Gunde Cottah Hill fort, Cuddapah, *Wight Herb.* 357.

Stems 1–2 ft., not thicker than a sparrow's quill, branched. *Leaves* 1–2 in., oblong-lanceolate, acuminate, flaccid, ciliate and sheaths sparsely hairy; floral sheaths terminal, erect, 1½–2 in. by ⅙–¼ broad, membranous, green, usually overtopping the panicle. *Spikes* ⅓–½ in., very pale; pedicels and joints sparsely hairy. *Upper spikelets* male; gl. I quite smooth, striate; II hyaline; IV awnless. *Stamens* more than half as long as gl. IV., linear.—A well-marked species by the spathe and tubercles of gl. I. A specimen from Belgaum (*Ritchie, n.* 796 in Herb. Munro) closely resembles this in the tubercled gl. I; it has only 2 very small imperfect anthers and no pedicelled spikelets.

6. **A. inermis,** *Hook. f.*; spikelets solitary (pedicelled 0) oblong-lanceolate, gl. I dorsally convex obtuse strongly 7-9-nerved unarmed margins (not incurved) and nerves scabrid.

The CONCAN, *Woodrow.*

Stems very slender, much geniculately branched. *Leaves* 1–2 in., ovate, broadly amplexicaul, caudate-acuminate, tips setaceous, glabrous or puberulous above, ciliate with long hairs beneath, margins smooth; sheath hairy. *Spikes* few, short, green, irregularly sparingly divided; peduncle slender, naked, branches ½ in., very slender, ciliolate. *Spikelets* $\frac{1}{10}$ in., all sessile, rather distant; gls. thin, I strongly nerved; II as long as I, obovate-oblong when spread out, obtuse, emarginate, apiculate, 3-nerved, hardly keeled, nearly smooth; III 0 (or palea of IV) shorter than II, lanceolate; awn basal, twice as long as the spikelet; palea oblong, obtuse, glabrous. *Anthers* very large.

** *Stamens* 2 *or* 3; *anthers not half the length of gl. IV.*

7. **A. ciliaris,** *Beauv. Agrost.* 3, t. xi. f. b; peduncles glabrous below the spikes, spikes many ½–3 in. subflexuous, joints = ⅔ the spikelets in length or longer glabrous or shortly ciliate, gl. I entire at the tip, nerves scabrid or echinate above the middle, II acute or acuminate. *Hack. Monogr. Androp.* 354; *Benth. Fl. Austral.* vii. 524 (*excl. syn.*).

Hance in Journ. Linn. Soc. xiii. (173) 134. Andropogon Retzii & incertus, *Steud. Syn. Gram.* 375.—Arthraxon, *Wall. Cat.* n. 8833. 8835 A. (B. *in part*) 8836.

Hilly districts of INDIA from Kashmir eastwards to Burma, ascending the Himalaya to 5500 ft., and southward to the Nilghiri Hills and CEYLON.

Stems tall or short, weak, rarely as thick as a crow-quill, tufted and branched from the base, or with long creeping stems and ascending leafy branches. *Leaves* 1–3 in., ovate to lanceolate, glabrous or laxly hairy, margins ciliate; sheath with ciliate margins. *Spikes* few or many, on long naked or spathaceously sheathed glabrous peduncles, pale green or purplish. *Spikelets* $\frac{1}{8}$–$\frac{1}{5}$ in., lanceolate or linear-lanceolate, callus naked or shortly bearded; gl. I scaberulous, 7–10-nerved; II obscurely 3-nerved; III much shorter, oblong acute; IV usually awned. *Stamens* variable in length never = $\frac{1}{2}$ gl. IV.—I give below Hackel's grouping of the two principal forms of this protean plant and their synonymy. For his elaborate subdivision of these into 4 subspecies and 9 varieties I must refer to his work. These are founded on characters of unequal value, and subject to diverse limitations. After a long study of the mass of materials at Kew I recognize the following widely distributed leading Indian forms:—1, *A. violaceus*; rather robust, spikes 6–20 1–2 in. long, spikelets $\frac{1}{5}$ in. more or less purple, awns twice as long as the spikelet or shorter; 2, *nudus*, usually tall and widely straggling, spikes many 1–2 in. very slender rachis capillary, sparsely hairy, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. narrow very pale, stamens as often 3 as 2; 3, *plumbeus*, stems shortly straggling much branched, leaves small, spikes 2–3 rarely more $\frac{1}{2}$-$\frac{3}{4}$ in. long, rachis capillary nearly glabrous, spikelets $\frac{1}{10}$ in. usually purple, approaches nearest to *A. microphyllus*; 4, *muriculatus*; habit of *plumbeus*, but nerves of gl. I echinulate nearly to the base.—N.W. India.

Hackel's two leading groups to which I have added a third :—

a. *Joints of rachis glabrous, or with a few scattered hairs towards the tip.*

A. ciliaris, *Beauv. l. c.* A. gracilis & lasiocoleos, *Hochst. in Flora*, xxxix. (1856) 188, 189. A. japonicus, *Miq. Ann. Mus. Bot. Lugd. Bat.* ii. 288. A. lanceolatus & nudus, *Hochst. in Flora*, xxxix. (1856) 159. A. Langsdorfianus, *Hochst. l. c.*; *Boiss. Fl. Orient.* v. 455. A. nudus, *Benth. ex Clarke in Journ. Linn. Soc.* xxv. (1889) 86. Batratherum nudum, *Nees ex Steud. Syn. Gram.* 383. Pleuroplitis centro-asiatica, *Griseb. in Ledeb. Fl. Ross.* iv. 477. P. Langsdorffiana, *Trin. Fund. Agrost.* 175, t. 16. Lucæa gracilis, *Kunth Revis. Gram.* ii. 489, t. 159, *Enum.* i. 472. L. Langsdorffiana, *Steud. l. c.* 413. Lasiolytrum hirtum, *Steud. in Flora* (1846) 18; *Syn. Gram.* 12. Las. pilosum, *Steud. ex Jord. in Num. Soc. Sc. Nat. Cherb.* v. (1857) 299. Pollinia ciliaris, *Spreng. Syst.* i. 289. Andropogon amplexifolius, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. 1833, 274. A. lasiocoleos & nudus, *Steud. l. c.* 383. Phalaris hispida, *Thunb. Fl. Jap.* 44. Deyeuxia japonica, *Spreng. l. c.* 254.

b. *Joints of rachis, at least the upper, more or less ciliate.*

A. coloratus, major, Schimperi, Schmidtii & violaceus *Hochst. l. c.* 188. Batratherum plumbeum, *Munro ex Duthie in Atkinson Gazette*, 640. Pleuroplitis ciliata, *Schmidt Beitr. Fl. Cap. Verd. Ins.* 152. P. plumbea & violacea, *Steud. l. c.* 414. P. Quartiniana, *Regel* in *Bull. Acad. Petersb.* v. (1866) 757, *Wight Cat.* n. 1683. P. caucasica, *Rupr. ex Regel in Bull. Acad. Petersb.* x. (1866) 373. Lucæa ciliata, major, plumbea & violacea, *Steud. l. c.* 414. Andropogon Alectoridia, *Steud. l. c.* 383. A. violaceus, *Heyne ex Steud. l. c.* 414. Alectoridia Quartiniana, *A. Rich. Tent. Fl. Abyss.* ii. 448, t. 99.—*Wall. Cat.* n. 8833 A.

c. *Spikes silkily villous, spikelets* $\frac{4}{5}$–$\frac{1}{3}$ *in., gl. I acute entire or minutely* 2-*toothed, awn* $\frac{1}{2}$ *in. or more.*

A. cuspidatus, *Hochst. in Flora* (1856) 188; *Hack. Monogr. Androp.* 353. A. micans, *Hochst. l. c.* Batratherum micans, *Nees in Ann. & Mag. Nat. Hist.* vii. (1835) 220. Pleuroplitis major, *Regel in Bull. Acad. Petersb.* v. (1866) 750 (*excl. Syn. Lucæa major*). Andropogon cuspidatus, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 456. A. lanceolatus, *Baker Fl. Maurit.* 444 (*non Roxb.*). A. micans, *Steud. Syn. Gram.* 382.—N.W. Himalaya, Nilghiri Hills, Mauritius, Afr. trop.

8. **A. microphyllus,** *Hochst. in Flora,* xxxix. (1856) 188; peduncles puberulous beneath the spikes, rachis of spikes strict, joints = ½ the spikelets in length or shorter ciliate with long hairs, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., nerves of gl. I scaberulous above the middle tip 2-toothed or 2-aristulate, II acuminate or awned, IV obtusely 2-toothed, awn very slender. *Hack. Monogr. Androp.* 353. A. lancifolius, microphyllus, & minor, *Hochst. in Flora* xxxix. (1856) 188. Batratherum molle, *Nees & Arn. in Mag. Nat. Hist. l. c.* 181; *Wight Cat.* n. 1686; *Aitchis. Cat. Panjab Pl.* 174. B. Schimperi, *Nees ex Hochst. l. c.* 177. Pleuroplitis lancifolia, microphylla & Schimperi, *Regel in Bull. Acad. Petersb.* x. (1866) 747-756. Lucæa Schimperi, *Steud. Syn. Gram.* 414. Andropogon microphyllus, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 275. A. lancifolius, *Trin. l. c.* 271; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 108. A. minor, *Hochst. l. c.* 188. A. molle, *Duthie Grass. N.W. Ind.* 17. A. muralis, *Herb. Ham. ex Wall. Cat.* n. 8828. A. multicaulis, *Steud. l. c.* 383. Psilopogon Schimperi, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 447. Ps. Figarei, *Figar. Ind. Sem. Hort. Gen.* (1852), *in Ann. Sc. Nat. Ser.* III. xix. (1853) 370. ?Pogonatherum tenue, *Edgew. in Journ. As. Soc. Beng.* (1853) 181. —Batratherum, *Wall. Cat.* n. 8828.

TEMPERATE HIMALAYA, from Kashmir, alt. 4–5000 ft. to Sikkim, alt. 5–11,000 ft.; the KHASIA HILLS and southwd. to the NILGHIRIS. BURMA, *Collett.* CEYLON, *Thwaites.*—DISTRIB. Tonkin, Afr. trop.

Except in the smaller size, hairy peduncles and rachis of the shorter spikes, small spikelets, and toothed tip of gl. I, there is little to distinguish this from some of the states of *A. ciliaris.* Hackel indeed says that these are very closely allied.

Sect. II. TRICHATHERUM, *Hack.* *Joints* of rachis of spike obliquely truncate. *Awn* 10 in. long, capillary, flexuous.

9. **A. jubatus,** *Hack. Monogr. Androp.* 358.

The CONCAN? *Stocks.*

Annual, decumbent, glabrous; stems slender, ascending, branching, 6–12 in. long. *Leaves* 1–2 by ¼–⅓ in., lanceolate from a convolute amplexicaul base, acuminate, flat, flaccid, pubescent or villous; sheaths lax, pubescent, upper spathiform leafless; ligule short. *Floral spathes* 1½–2½ in., linear-lanceolate, membranous, green, enclosing the spikes, pubescent. *Spikes* binate on a common peduncle, a subsessile and a pedicelled, pedicel slender pubescent, fragile; joints about 4, half as long as the spikelet, and shorter pedicels of upper spikelet clavate, compressed, pectinately ciliate. *Spikelets* binate, a sessile and pedicelled at each joint, and a terminal male. *Sessile spikelets* ⅓ in., membranous, linear-lanceolate, 2-nerved, deeply inflexed in the middle line, tip 2-mucronate, margins hyaline; II as long, linear-lanceolate, laterally compressed, 1-nerved, keel scabrid; III shorter, linear, nerveless, glabrous; IV = ½ III, lanceolate acute, glabrous, with the immensely long awn attached to its base, palea 0. *Pedicelled spikelets* about ⅕ in., awnless.

UNDETERMINABLE SPECIES.

BATRATHERUM, *Wall. Cat.* 8827 (Andropogon minutissimus, *Herb. Heyne*) is a dwarf or very immature state and unrecognizable.

41. ISCHNOCHLOA, *Hook. f.*

(Genus not in the clavis, p. 4.)

A small, slender, straggling, flaccid, leafy annual. *Leaves* elliptic-lanceolate, acute at both ends. *Spikes* solitary, simple, shortly exserted from the uppermost leaf-sheaths; rachis very slender, linear, flattened,

with thickened margins, inarticulate. *Spikelets* 1-fld., minute, binate, a sessile and a pedicelled, lanceolate, both awned and bisexual; callus minute, ciliate. *Glumes* 3 (III absent) I linear-oblong, subcoriaceous, 5–6-nerved, dorsally flattened, tip broadly hyaline truncate irregularly 2-toothed, margins incurved, keels ciliate; II oblong, keeled, obtuse or truncate, 3-nerved, ciliate towards the tip; IV much shorter, very narrow, cleft to the middle, lobes subulate; awn in the cleft, capillary, geniculate, palea 0. *Lodicules* cuneate. *Stamens* 3, anthers oblong. *Styles* short, free. *Grain* subfusiform, terete, grooved one side.

A remarkable genus, with the habit of *Arthraxon* (closely resembling *A. microphyllus*), next which it may be provisionally placed, but not nearly related to it, differing in the inarticulate flat rachis of the simple spike, bisexual awned pedicelled spikelets, and absence of gl. III.

I. Falconeri, *Hook. f. in Hook. Ic. Pl. t.* 2466.

North Western Himalaya; growing amongst moss, *Falconer.*

Stems 6–8 in., very slender, sparingly branched, leafy to the tips, filiform; internodes concealed by the leaf-sheaths. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., flat, acute or acuminate; sheath deeply furrowed, glabrous; ligule a few hairs. *Spikes* $\frac{1}{2}$–1 in., very slender, green, peduncle capillary as long as the leaf-sheath; rachis exactly linear, flexuous, quite glabrous, not disarticulating at the transverse glabrous nodes. *Spikelets* $\frac{1}{10}$ in. long, rather longer and broader than the internodes; gl. I with the 2 lateral (carinal) nerves only reaching the tip; II with a stout median nerve and 2 very slender lateral ones anastomosing with it below the tip.

42. **THELEPOGON**, *Roth.*

A coarse perennial grass. *Leaves* lanceolate, base cordate, amplexicaul. *Spikes* few or many, corymbosely fascicled, peduncled, lower whorled, upper distant; rachis flexuous, fragile; joints more or less deeply excavated. *Spikelets* solitary at the joints, with the rigid pedicel only of an upper, ovoid, acute. *Glumes* 4, I thickly coriaceous, convex, beaked, transversely rugose ridged or tubercled; II sunk in the cavity of the joint, rigid, sparingly tubercled, acuminate; III shorter, hyaline, paleate, usually male; IV bisexual, hyaline, deeply bifid, with a long twisted awn in the sinus; palea narrow. *Lodicules* broad. *Anthers* 3, very long. *Styles* free, stigmas short. *Grain* narrowly oblong, free.

T. elegans, *Roth. ex Roem. & Sch. Syst.* ii. 788. *Nov. Pl. Sp.* 62; *Hack. Monogr. Androp.* 267. Andropogon Princeps, *A. Rich. Tent. Fl. Abyss.* ii. 471, t. 102. Rhiniachne Princeps, *Hochst. ex Steud. Syn. Gram.* 360 (*in Syn.*). Jardinea abyssinica, *Steud. Syn. Gram.* 360.

Central India, the Concan and Malabar.—Distrib. Afr. trop.

Stems 6 in. 3 ft., tufted and branching from the base, or woody as thick as a crow-quill below and geniculately branching upward; roots stout, rigid. *Leaves* 3–10 by $\frac{1}{3}$–$\frac{2}{3}$ in., linear, acuminate, rather thin, and sheaths glabrous scabrid or hispid with tubercle-based hairs, margins denticulate; ligule very short. *Spikes* 1–3$\frac{1}{2}$ in., peduncle slender, stiff; rachis compressed, much narrower than the spikelets, of upper spikelets tubercled; joints as long as the spikelets, subclavate, scaberulous, top orbicular cupped. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., yellow or brown; callus annular, bearded; gl. I very thick, hard, beak echinate; II with usually one transverse row of tubercles; III broad, 2-nerved, glabrous; palea narrow, acute, nerveless; IV ovate-lanceolate, 3-nerved, glabrous; lobes lanceolate, 1-nerved; awn = 3–4 gl. in.

length; palea as long as the gl., oblong, acuminate, 2-nerved. *Pedicel* of arrested spikelets flat, scabrid.—Gl. III and its palea would appear to have exchanged their character of nervation. A curious gigantic state? collected by Ritchie at the Kola Nuddi Waterfall (in the Concan?) has the upper spikelets densely softly villous, gls. I and II thin hardly tubercled, the lower spikelets appear to be binate but are very imperfect.

43. LOPHOPOGON, *Hack.*

Small perennial densely tufted grasses. *Leaves* very narrow. *Spikes* very short, solitary 2-nate or fascicled on the ends of capillary branches, very fragile; joints very short, slender, tips cupular. *Spikelets* small, homogamous or heterogamous, 1–2-fld., 2–3-nate, one sessile, callus conical villous. *Glumes* 4, I and II chartaceous, I oblong, broadly truncate, irregularly 3–4-toothed, 7-nerved, dorsally convex; II longer than I, lanceolate, narrowed into a straight awn, 3–5-nerved, hispidly villous on the sides, and with tufts of hairs dorsally below the middle; III hyaline, oblong-lanceolate, acute or aristulate, ciliolate, 1-nerved, 1–2-androus or neuter, palea linear 2-nerved; IV nearly as long as III, fem. or bisexual and diandrous, linear-oblong, 2-fid, lobes setiform and margins hispidulous; awn in the cleft, much longer than the gls. tortuous and twisted; palea minute, quadrate, lobulate, 2-nerved. *Lodicules* 0. *Anthers* narrow. *Styles* combined below, stigmas very long.—Species 2, Indian and a 3rd? Australian.

In *L. tridentatus* the lower spikelets sometimes form a whorl at the apex of the peduncle as in *Germainia*. In this species also the upper spikelet is usually male or neuter. Hackel suggests the probability of *Retz's Andropogon incurvatus* (Obs. v. 21 *non Trin.*) from Tranquebar, *Koenig*, being a *Lophopogon*.

1. **L. tridentatus,** *Hack. in Engl. & Prantl. Nat. Pflanzenfam.* ii. II 56, *Monogr. Androp.* 254, t. i. f. 14; stem subsimple, spikes more or less closely sheathed. *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 201; O. Kuntze, *Revis. Gen.* i. 197. Andropogon tridentatus, *Roxb. Fl. Ind.* i. 257; *Steud. Syn. Gram.* 372. Saccharum tridentatum, *Spreng. Syst.* i. 283.—Gen. Nov. *Wall. Cat.* n. 8842.

The Concan and Canara, *Heyne*, &c. Central Provinces, Khandua, *Duthie*.

Stem 4–6 in. *Leaves* 2–4 in., rigid, 3-nerved; sheath short, upper ventricose; ligule obscure, ciliate. *Heads of spikes* $\frac{1}{3}$–$\frac{1}{2}$ in.; sheaths ovoid, flattened, membranous, caudate-acuminate. *Spikes* $\frac{1}{2}$–1 in. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., brown when dry; gl. I of lower spikelet dorsally naked, of upper with tufts of long bristles below the middle; II back and margins villous, with a pencil of hairs on each side about the middle.

O. Kuntze, l. c. has two varieties: *α. Wrightii*, Nees mss., with red hairs at the base of gl. I., and *β. Munroi*, with none.

2. **L. Kingii,** *Hook. f.*; stem subcorymbosely branched above, spikes long-peduncled.

Behar; at Monghir, *Herb. Hort. Calcutt.*

Foliage and spikelets nearly as in *L. tridentatus*, but habit very different. The subcorymbose branches of the stem bear subulate leaves and capillary peduncles 1–2 in. long embraced by almost filiform sheaths with acicular tips. *Spikes* solitary or few together, $\frac{1}{2}$ in. long, pale yellow-brown, fragile.—More materials are wanting for a trustworthy description of the inflorescence.

44. **APLUDA,** Linn.

A leafy perennial grass. *Stems* geniculately ascending from a creeping or decumbent base, sometimes scandent, paniculately branched. *Leaves* petioled, flat; sheaths of upper spathiform. *Inflorescence* of very many solitary small simple spikes, terminating the stem and branches, each enclosed in a special membranous peduncled spathe, together forming a leafy panicle. *Spikes* of one linear joint gibbously bulbous at the base, and jointed on the peduncle at the base of the spathe by a minute curved pedicel; rachis (joint) smooth. *Spikelets* 3, a sessile 2-fld. bisexual with a pedicelled imperfect (reduced to a small gl) at the base of the rachis, and a terminal male or neuter, rarely bisexual; sessile spikelet seated on the bulbous base of the rachis (callus of authors); gls. 4, I chartaceous convolute many-nerved margins not inflexed, II compressed 5–7-nerved dorsally gibbous keeled, III ovate-lanceolate hyaline male paleate, IV much smaller bisexual ovate paleate entire or 2-toothed, awned or not. *Lodicules* 2, cuneate. *Stamens* 3, anthers short. *Styles* free. *Grain* oblong, embryo large.

In the above description I consider what Hackel describes as the pedicel of the upper spikelet to be the rachis of the uninodal spike; and his callus of the sessile spikelet to be a bulbous inflation of the base of the rachis.

A. varia, *Hack. Monogr. Androp.* 196. A. aristata and mutica, *Auct.*—Apluda, *Wall. Cat.* n. 8760, 8761.

Throughout INDIA and BURMA, ascending the Himalaya to 8000 ft. CEYLON, up to 4000 ft.—DISTRIB. E. trop. Asia, Malaya, Australia, Ins. Pacific.

Stem 1–7 ft. or more, solid, as thick as a crow-quill below; branches flexuous; roots wiry. *Leaves* 4–18 in., subbifarious, linear-lanceolate, cuspidately acuminate, base narrowed usually petioled, above and margins scaberulous, glaucous beneath, upper gradually shorter; sheaths glabrous, rarely hairy, upper shorter and dilated into spathes with subulate tips; ligule short, rounded. *Spathes* of the flg. branches about 4 in. long, cymbiform, thin, many-nerved; of the spikes smaller, very variable in length, longer or shorter than their almost capillary peduncles. *Spikes* $\frac{1}{4}$–$\frac{1}{3}$ in., green or pale violet. *Sessile spikelet* $\frac{1}{8}$–$\frac{1}{5}$ in.—The following is Hackel's arrangement of the very unstable Indian varieties of this polymorphous plant. It is especially useful as approximately classifying its intricate synonymy.

Subsp. MUTICA, *Hack.*; gl. IV very rarely awned; I straight glabrous; II dorsally gibbous keel depressed above the gibbosity acute glabrous; panicle usually lax, ultimate flg. branchlets usually half as long as the sheath.—A. mutica, *Linn. Sp. Pl.* 82; *Gærtn. Fruct.* ii. t. 175; *Lamk. Ill.* t. 841, f. 1; *Anderss. in Œfvers. Vet. Akad. Stockh.* (1855) t. 5, f. 6. A. gigantea, *Spreng. Syst.* i. 290. ?A. glauca, *Schreb. Beschr. Græs.* 99. A. geniculata, *Roxb. Fl. Ind.* i. 325. Andropogon glaucus, *Retz. Obs.* v. 20. Calaminea gigantea, *Beauv. Agrost.* 15, t. 23, f. 1.

Var. *humilis*; clusters of spikes distant, spathe of spike $\frac{1}{5}$–$\frac{1}{4}$ in., sessile spikelet $\frac{1}{7}$–$\frac{1}{5}$ in., callus $\frac{1}{40}$ in., gl. I entire, imperfect spikelet hirsute. A. humilis, *Kunth Enum. Pl.* i. 517. A. Cumingii, *Buese ex de Vriese Pl. Reinw.* 105. A. inermis, *Regel in Act. Hort. Petrop.* vii. (1880) 658. A. mucronata, *Steud. Syn. Gram.* 404. Calamina humilis, *Roem. & Schult. Syst.* ii. 810.

Subsp. ARISTATA, *Hack.* gl. IV of sessile spikelet cleft to the middle; I chartaceous; II dorsally less gibbous, keel sometimes scabridly ciliate often 2-mucronate; panicle dense, ultimate flg. branchlets shorter than the spathes, clusters of spikes close or confluent. A. aristata, *Linn.*

Cent. ii. 7; *Schreb. Beschr. Gräs.* 93. *Lamk. Ill.* t. 841, f. 1; *Steud. Syn. Gram.* 403; *Roxb. Fl. Ind.* i. 324; *Dalz. & Gibs. Bomb. Fl.* 303; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab Pl.* 174; *Duthie Fodd. Grass. N. Ind.* 44, t. 29. A. Gryllus, *Beauv. Agrost.* 133 (*cf. corrigend. in Suppl.*) t. 23, f. 5.

Var. *aristata proper*; spathe rather shorter than its spike, sessile spikelet $\frac{1}{8}$–$\frac{1}{5}$ in., bulbous base $\frac{1}{40}$–$\frac{1}{25}$ in., gl. I glabrous nerves scabrid, terminal spikelet = sessile, pedicelled spikelet minute. A. microstachya, *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 194. A. scabra, *Anderss. l. c.* 179. Ischæmum involucratum, *Hb. Russ. in Wall. Cat.* n. 8794 A.

Var. *ciliata*; tall, robust, flg. spathes glabrous or hairy, spathe half as long as its spike, sessile spikelet $\frac{1}{4}$–$\frac{1}{3}$ in., bulbous base $\frac{1}{12}$–$\frac{1}{10}$ in., gl. I and rachis puberulous, spathe glabrous or with tubercle-based hairs. A. ciliata, *Anderss. l. c.* 177-179.—"Hardly a distinct variety," Hackel.

Var. *villosula*; spathe half as long as its spike, sessile spikelet $\frac{1}{4}$ in., bulbous base of rachis $\frac{1}{12}$ in., gl. I and pedicel scabrous-pubescent, terminal spikelet shorter than the sessile, pedicelled spikelet $\frac{1}{12}$ in. ciliate. A. communis, *Nees & Arn. in Nov. Act. l. c.* 194; *Anderss. l. c.* 177, t. 5, 2. A. villosa, *Schreb. Beschr. Gräs.* 98?—*Wight Cat.* n. 1713.

Var. *rostrata*; spike strongly incurved far exserted beyond the spathe, spikelet $\frac{1}{4}$ in., callus $\frac{1}{8}$–$\frac{1}{5}$ in. A. rostrata, *Arn. & Nees l. c.* 194. *Wight Cat.* n. 1714.—Apluda, *Wall. Cat.* n. 8762.

45. **VOSSIA,** *Wall. & Griff.*

A gigantic floating grass. *Spikes* terminal, solitary or 2- (rarely 3–6-) nate, stout; rachis narrow, compressed, flexuous, jointed. *Spikelets* 2-fld., imbricate, 2-nate, longer than the subexcavate joints, one sessile by a very broad callus; the other smaller pedicelled. *Glumes* 4, I very broad, ovate, flattened, coriaceous, smooth, narrowed into a long rigid green tail; II chartaceous, ovate-lanceolate, acute, 3-nerved, keeled above; III hyaline, 2-nerved, paleate, male; IV hyaline, oblong, 3-nerved, tip ciliate, palea 2-nerved. *Lodicules* large, toothed. *Anthers* 3, long. *Styles* distinct, stigmas short. *Grain* unknown.

V. procera, *Wall. & Griff. in Journ. As. Soc. Beng.* v. (1836) 573, t. 23; *Wall. Cat.* n. 8878; *Grant in Trans. Linn. Soc.* xxix. 175, t. 116; *Hack. Monogr. Androp.* 270. V. cuspidata, *Griff. Notul.* iii. *Index* p. xii., *Ic. Pl. Asiat. Index* p. v. t. 153. Ischæmum cuspidatum, *Roxb. Fl. Ind.* i. 324; *Kunth Enum. Pl.* i. 516; *Griff. Notul.* iii. 70. I. ensiforme, *Herb. Ham. ex Wall. Cat. l. c.*

Jheels of Bengal, Silhet and Assam.—Distrib. Afr. trop.

Stem 6–12 ft., spongy, as thick as the thumb, rooting at the lower nodes. *Leaves* 1 2 ft., linear, acuminate, hispidulous, midrib stout; sheath large; ligule densely ciliate. *Spikes* 6–8 in., nearly terete; rachis narrower than the gls., margins ciliolate; joints $\frac{1}{4}$ in., and pedicels cupped at the tip. *Spikelets* 1–$1\frac{1}{2}$ in. with the spreading ciliolate tail of gl. I, green, callus annular.—Hardly generically different from *Ischæmum.*

46. **ROTTBOELLIA,** *Linn. f.*

Tall, annual or perennial grasses. *Spikes* few or many, subsolitary or panicled rarely racemose or panicled; rachis usually fragile, joints usually excavate at the tip. *Spikelets* 2- rarely 3-nate, one (rarely two)

sessile and both or one only perfect, the other pedicelled imperfect, with the pedicel often adnate to the joint. *Sessile spikelets*, glumes 4, I coriaceous, flat or slightly convex, obtuse or acute, rarely 1–2-awned; II thinner, keeled; III hyaline, neuter or male; IV hyaline, 1 or 3-nerved, usually paleate, palea usually 2-nerved. *Lodicules* 2, truncate. *Stamens* 3. *Styles* distant. *Grain* oblong or obovoid, subcompressed dorsally.—Species about 30, temperate and tropical.

I have followed Hackel for the most part in the disposition of the species of the first four sections of the genus. For my departure from him in the fifth see remarks under *Ophiurus* (p. 160).

A. Sessile spikelets solitary in all the joints of the spike.

Sect. I. PHACELURUS, *Hack.* *Spikes* digitately racemed (rarely solitary), rachis fragile, tips of joints flat, not hollowed. *Spikelets* 2-fld.—Phacelurus, *Griseb.* (gen.)

1. **R. speciosa,** *Hack. Monogr. Androp.* 282; perennial, spikes solitary or alternate or subdigitately fascicled 2–3½ in. long, spikelets ⅙–¼ in. 1-fld., gl. I flat 11–13-nerved. Ischæmum speciosum, *Nees ex Steud. Syn. Gram.* i. 375. Andropogon speciosus, *Steud. l. c.* Vossia speciosa, *Benth. in Journ. Linn. Soc.* xix. (2881) 70; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 32.

WESTERN TEMPERATE HIMALAYA, alt. 5500–9000 ft., from Kashmir to Garwhal, *Royle*, &c.

Stems tufted, 1–4 ft., stout or slender, simple above. *Leaves* 6–12 by ¼–½ in., linear, hispid or glabrate, margins scabrid; sheath glabrous or margins above hairy; ligule a ciliate border. *Spikes* 3–6 in., rarely solitary, glabrous, green or purplish; joints about as long as the spikelets, subclavate, trigonous, angles ciliate. *Spikelets* lanceolate, glabrous; gl. I obtuse, tip oblique, margins narrowly inflexed, keels scaberulous; II navicular, acute; III lanceolate, 3–5-nerved; IV elliptic-lanceolate, 1-nerved.

Sect. II. THYRSOSTACHYS, *Hack.* *Spikes* panicled, lower whorled, peduncled; rachis fragile, tips of joints hollowed. *Spikelets* 1-fld.

2. **R. Zea,** *Clarke in Journ. Linn. Soc.* xxv. (1889) 86, fig. 38; panicle thyrsiform or pyramidal, spikes smaller upwards, spikelets ⅙ in., gl. I scabrid 1–3-nerved. *Hack. Monogr. Androp.* 690. R. thyrsoidea, *Hack. l. c.* 283.

KHASIA HILLS, alt. 2–3000 ft., *J. D. H. & T. T., Clarke.* MUNNEPORE, alt. 3500 ft., *Clarke.* UPPER BURMA; at Camein on the Mogaung river, *Griffith.*

Stem tall, 6–8 ft., very stout, as thick as the forefinger below, erect, simple or sparingly branched, nodes silky. *Leaves* large, 2–3 ft. by 1–1½ in., linear, flat or complicate, glabrous, margins scabrid; sheaths subcompressed; ligule short, truncate. *Panicle* 10–20 in. long, long-peduncled, rachis very stout, strict. *Spikes* erecto-patent, lower branched, sometimes distichously; rachis stout, flexuous or zigzag, joints about as long as the spikelets, subclavate, glabrous. *Spikelets* glabrous; gl. I obtuse, dorsally scabrid, 1–3-nerved, margins narrowly inflexed, keels scaberulous; II ovate, acute, 3-nerved; III lanceolate; IV oblong, obtuse.

Sect. III. HEMARTHRIA, *Hack.* *Spikes* solitary or fascicled, compressed; joints coherent or subfragile, tips obliquely or transversely truncate, not hollowed. *Spikelets* of each pair similar, pedicel of upper usually adnate to the joint of the rachis.—Hemarthria, *Br.* (Gen.).

3. **R. compressa,** *Linn f. Suppl.* 114; rachis of spike coherent, sessile spikelets $\frac{1}{10}$–$\frac{1}{5}$ in., callus distinct, gl. I of sessile spikelets coriaceous obtuse or acute 7–9-nerved, gl. II of pedicelled acuminate or shortly awned 7–9-nerved.

Throughout the hotter parts of INDIA, generally in wet places, Burma and CEYLON.—DISTRIB. Westwards to Spain and the Canaries, and in most warm climates.

Erect or decumbent below, usually branched throughout, leafy; nodes glabrous or pubescent. *Leaves* short or long, linear, acute, margins and sometimes the upper surface scaberulous; mouth of sheath hairy. *Spikes* solitary or fascicled, $2\frac{1}{2}$–5 in. long, slender, erect, rarely branching; gl. I of pedicelled spikelets subulate or narrowly lanceolate, tip scabrid.—A polymorphous grass, whose Indian varieties are disposed of as follows by Hackel:—

Var. *α. genuina,* Hack. l. c.; stems creeping below, then erect, scandent, 5–20 ft. long (*Roxb.*), spikes slender solitary or 2–3-nate, spikelets $\frac{1}{7}$–$\frac{1}{6}$ in., gl. I broad ovate-lanceolate obtuse not constricted below the tip. R. glabra, *Roxb. Fl. Ind.* i. 353; *Wall. Cat.* n. 8871 A. R. anceps & quarterna, *Herb. Ham. ex Wall. l. c.* B. C. Hemarthria compressa. *Kunth Enum.* i. 465 (*in part*); *Grah. Cat. Bomb. Pl.* 233; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107; *Aitchis. Cat. Panjab. Pl.* 172; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 30. H. coromandelina, *Steud. Syn.* 358.—Common in India.—Hackel does not notice Roxburgh's description of this grass as scandent, and attaining 20 ft. in length.

Var. *β. fasciculata,* Hack. l.c.; stem 2–5 ft. creeping, then erect, upper spikes usually fascicled longer stouter often curved, spikelets $\frac{1}{8}$–$\frac{1}{4}$ in., gl. I of sessile constricted below the tip. R. altissima, *Poir. Voy. Barb.* ii. 105. R. compressa, *Linn. f. Suppl.* 114; *Retz. Obs.* iii. 12; *Roxb. Fl. Ind.* i. 354. R. fasciculata, *Lamk. Ill.* i. 204; *Desf. Fl. Atlant.* t. 36. R. spathacea, *Ten. Fl. Nap. Prodr.* p. xi. Lodicularia capensis, *Nees Fl. Afr. Austr.* 128. L. fasciculata, *Beauv. Agrost.* 108; *Wight Cat.* n. 1721. L. fastigiata, *Herb. Beauv.* (*non Agrostogr.*). L. laxa, *Nees ex Steud. l. c.* 358. L. peruviana, *Meyen Reise,* ii. 71. Lepturus fasciculatus, *Trin. Fund. Agrost.* 123. Hemarthria capensis, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 248. H. caudiculata, *Steud. l. c.* 359. H. fasciculata, *Kunth Revis. Gram.* i. 153, *Enum.* i. 465; *Benth. Fl. Hongk.* 418; *Hack. in Mart. Fl. Bras.* ii. 111, 314, t. 72, f. 2; *Duthie Grass. N.W. Ind.* 13, *Fodd. Grass. N. Ind.* 30. H. laxa, *Steud. l. c.* 358. —Hemarthria, *Wall. Cat.* n. 8871 (*in part*).—Common especially on the borders of pools often climbing amongst bushes.

Var. *δ. japonica,* Hack. l. c. 288; leaves with setaceous tips, upper spikes subfascicled stout, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in., gl. I sessile hardly constricted below the subobtuse tip 7–11-nerved, of pedicelled lanceolate not subulate.—Hackel says of this Japan plant that "Wallich's n. 8868 B is exceedingly like it." But that number of Wallich's Herb. is *Ratzeburghia pulcherrima,* and there is no B under it.

4. **R. protensa,** *Hack. Monogr. Androp.* 289; rachis of spike firm, sessile spikelet $\frac{1}{5}$ in. lanceolate, callus obscure, gl. I subacute many-nerved, gl. II of pedicelled spikelet lanceolate narrowed into a long slender awn 1–3-nerved. R. repens, *Roxb. mss. ex Wall. Cat.* Hemarthria protensa, *Steud. Syn. Gram.* 359. ? H. vaginata, *Bühse Pl. Jungh.* iii. 354 (*ex Hack.*).—Hemarthria, *Wall. Cat.* n. 8872, 8910.

ASSAM, BENGAL, SILHET, CACHAR and the KHASIA HILLS, in marshes. ? LACCADIVE ISLDS., *A. B. Hume.*

Stem 3–6 ft., erect from a decumbent base, stout, leafy, flowering from all the nodes. *Leaves* 3–12 by $\frac{1}{9}$–$\frac{1}{4}$ in., linear-lanceolate, acuminate, narrowed from below the middle to the base, surfaces and margins smooth, glabrous; sheath glabrous or hairy. *Spikes* 4–8 in., slender, joints shorter than the sessile spikelets, top transversely truncate; pedicels adnate to the joints. *Sessile spikelets* linear-lanceolate; gl. I

narrowed from the middle upwards; II more or less usually wholly adnate to the joint, IV very short or 0. *Pedicelled spikelets*, gl. I 7-nerved; II $\frac{1}{3}$–$\frac{1}{2}$ in., keel excentric.—Very nearly allied to *R. compressa*. "The only Androp. grass in which fruiting spikelets are not detached, hence there can be no dissemination except from the whole spike," Hackel. The Laccadive Islds. specimens are very slender with narrow leaves and quite erect strict lanceolate finely acuminate spikelets, rather longer than the joints.

Var. *Hamiltoniana*; callus of sessile spikelets bearded with short hairs. ? R. Hamiltoni, *Trin. mss. ex Steud. Nom. Ed.* II. ii. 474. R. compressa, *Wall. Cat.* n. 8870 A. C. R. compressa *var.* Hamiltoniana, *Hack. Monogr. Androp.* 288. Hemarthria Hamiltoniana, *Steud. Syn. Gram.* 358. Lodicularia Hamiltoniana, *Nees ex Steud. l. c.* 359.—Lower Gangetic Plain; Nathpur, *Hamilton.*—Referred to *compressa* by Hackel, but I think nearer to *protensa.*

5. **R. longiflora**, *Hook. f.*; spikes short, rachis firm, sessile spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. lanceolate narrowed into a long point, callus obscure, gl. II rather longer subaristate, pedicelled spikelets like the sessile.

TENASSERIM; at Mergui, *Griffith.* ASSAM, *Herb. Munro.*

Stem 1–2 ft., erect, leafy, stout, spongy; nodes glabrous or pubescent. *Leaves* 3–6 by $\frac{1}{4}$–$\frac{1}{3}$ in., linear-lanceolate from a rounded base, flaccid, smooth, glabrous, margins smooth; sheath inflated; ligule short, membranous. *Spikes* 4–6 in., sheathed below, stout, nearly $\frac{1}{4}$ in. across the spikelets; rachis subtetragonous. *Spikelets* twice as long as the joints, the pedicelled rather longer and longer awned than the sessile; gl. II adnate to the joint; III of sessile spikelet oblong, obtuse, nerveless; IV like III, palea small. *Lodicules* quadrate, broader than long, membranous. Gl. IV of *pedicelled spikelet* narrower than the sessile, paleate, with imperfect stamens and pistil.—Resembles a very large state of *R. protensa.*

Sect. IV. PELTOPHORUS and CŒLORHACHIS, *Hack.* *Spikes* solitary or fascicled, fragile, terete or compressed; joints transversely (rarely obliquely) truncate, deeply hollowed, dorsally convex, ventrally excavate; pedicel of upper spikelet free or adnate to the joint of the rachis, tip hollowed. Peltophorus, *Desv.* (Gen.).

* *Gl. I of sessile spikelets broadly winged.*

6. **R. Myurus**, *Benth. in Journ. Linn. Soc.* xix. (1881) 68; perennial, gl. I of sessile spikelet panduriform dilated above the middle into an orbicular wing, and towards the base into two auricles joined by a transverse ridge. *Hack. Monogr. Androp.* 290. Manisuris Myurus, *Linn. Mant.* ii. 300; *Desv. ex Beauv. Agrost.* 14, t. 1; *Rottl. in Neue Schrift. Nat. Fr. Berl.* iv. (1803) 191; *Roxb. Corom. Pl.* ii. 10, t. 117, *Fl. Ind.* i. 351; *Schreb. Beschr. Graese*, t. 43; *Kunth Enum. Pl.* i. 470; *Griff. Notul.* iii. 100; *Miq. Fl. Ind. Bat.* iii. 410. Peltophorus Myurus, *Desv. in Nouv. Bull. Soc. Philom.* ii. (1810) 188, *Journ. Bot.* i. (1813) 73; *Beauv. Agrost.* 119, t. 21, f. 11; *Wall. Cat.* n. 5880; *Wight Cat.* n. 1725, *Herb.* n. 3071. Ischæmum, Myurus & Ægilops sanguinea, *Herb. Linn.*

The Deccan Peninsula, *Heyne*, *Wight*, &c., in dry places.

Stem creeping and rooting, with ascending compressed branches 6–28 in. high. *Leaves* 2–6 in., spreading, linear, acute, flat, glabrous; sheath compressed, margins ciliate; ligule short, ciliate. *Spikes* 1–2 in., solitary, terminal and axillary, shortly exserted; joints scaberulous, shorter than the spikelets, excavate on each side leaving a pore between the spikelet and joint. *Sessile spikelets* $\frac{1}{10}$ in., brown, callus minute; gl. I scaberulous, 5-nerved, wing scarious; II ovate, acute, 3-nerved; III oblong, obtuse, empty; IV lanceolate, nerveless; palea obsolete. *Pedicelled spikelets*; gl. I oblong, obtuse, 5-nerved, winged on one side; II navicular, 3-nerved; III 3-nerved, paleate; IV oblong, obtuse, male; pedicel free or adnate to the joint.

7. **R. acuminata,** *Hack. Monogr. Androp.* 291; annual, spikes short, gl. I of sessile spikelet broadly ovate acuminate winged above the middle, coriaceous below it with 3 to 6 dorsal transverse echinulate or warted ridges.

The DECCAN PENINSULA, *G. Thomson*; N. Canara; Carwar, *Talbot.*

Stem 3–12 in., ascending from a creeping base, compressed, leafy. *Leaves* flaccid, lower 2–3 in., linear-lanceolate from a narrow base, acuminate, upper shorter spreading and recurved; sheath turgid, compressed, keeled, mouth hairy; ligule short, truncate, glabrous. *Spikes* 1–2 in.; joints subclavate, much shorter than the sessile spikelets, base not excised. *Sessile spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., callus obscure; gl. I 5-nerved in the narrow coriaceous part between the wings; II elliptic-lanceolate, acute, 3-nerved; III elliptic, paleate, male; IV short, oblong, obtuse; palea small, 2-lobed, nerveless. *Pedicelled spikelet*; gl. I winged on one side, 5-nerved, base not tubercled; II 3-nerved; IV male, lanceolate, many times longer than the joint.

Var. *Stocksii*; diffusely branched from the root, gl. I of pedicelled spikelet $\frac{1}{5}$ in. subulate-lanceolate erect or recurved narrowed into a slender scaberulous awn not or obscurely winged.—Malwar, *Stocks.*—The long gls. of the pedicelled spikelets give this variety a very different appearance, but intermediates occur, and the specimens were mixed with those of *R. acuminata* proper.

8. **R. divergens,** *Hack. Monogr. Androp.* 293; annual, spikes short, gl. I of sessile spikelet crossed below the middle with echinulate ridges ovate 2-mucronate or 2-aristate with broad hyaline wings above the middle. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 195.

EAST INDIES, *Huegel.* The CONCAN and CANARA; Belgaum, *Ritchie*; Satara and Mahableshwar, *Lisboa.*

Stem 4–10 in., erect or ascending, slender, terete, nodes 2–3 all with 2-nate flowering branches. *Leaves* $1\frac{1}{4}$–$1\frac{1}{2}$ in., narrowly linear, hairy beneath and on the margins; sheath compressed, naked, hairy; ligule short, membranous, rounded. *Spikes* about $\frac{2}{3}$ in., slender, erect, pale; joints shorter than the spikelets, subclavate, excised, outer margins of the cavities ciliate. *Sessile spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in., broadly oblong, dorsally with 7 lines of small pits (Hackel) or rugose with long or short transverse tubercled or echinate ridges or crests, mucros or awns erect scabrid sometimes as long as the spikelet; II shorter, ovate, acute, keeled, 3-nerved, III broadly ovate, nerveless, empty; IV = III, ovate-oblong, obtuse, nerveless. *Pedicelled spikelets* lanceolate; gl. I smooth, 5-nerved, broadly inflexed on one side with a winged keel, on the other produced into a mucro; II lanceolate, acute, keel winged; pedicel adnate.—The ridges on gl. I of the sessile spikelet are very variable, and are sometimes replaced as it were by vertical rows of incurved spinules on the nerves.

9. **R. Talboti,** *Hook. f.* (*non Lisboa*); annual, leaves linear, spikes solitary short, gl. I of sessile spikelet lanceolate narrowed into a slender scabrid awn, and with 3 transverse ciliolate ridges towards the base broadly winged above it, pedicel of upper spikelet adnate to the joint of the rachis.

GOA DISTRICT, *Talbot.*

Stems 6–8 in, slender, erect or base geniculate, subsimple. *Leaves* 2–3 in., narrow, smooth; sheath glabrous; ligule short, membranous. *Peduncles* 2–3 in., very slender, flexuous. *Spikes* $\frac{1}{6}$ in. diam., green, joints very short, tumid, excavate opposite the spikelet, top broad, cavity very large, margins thick hispidulous. *Spikelets* closely imbricating, $\frac{1}{2}$ in. long including the awn; callus annular, ciliolate; gl. I of sessile spikelet many-nerved on the coriaceous disk; II much shorter, hyaline, ovate-oblong, acute, 1-nerved; III broadly oblong, tip rounded, faintly 3-nerved, male; IV small, oblong, obtuse, nerveless, palea as long nerveless. *Pedicelled*

spikelets as long as the sessile; gl. I very unequally winged, dorsally smooth, awn as in the sessile; pedicel wholly adnate to the joint of the rachis.

10. **R. Clarkei,** *Hack. in Œstr. Bot. Zeitschr.* xli. (1891) 8; annual, leaves lanceolate base cordate, spikes solitary short, gl. I of sessile spikelet orbicular-oblong dorsally gibbous and scabrid below the middle winged above it, tip notched, pedicel of upper spikelet quite free. R. gibbosa, *Hack. ex Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 195. R. Talboti, *Lisboa mss. l. c.*

BEHAR, on Parusnath; and Hazaribagh, in CHOTA NAGPORE, alt. 2000 ft., *Clarke.* BOMBAY; N. Kundra District, *Talbot, Lisboa.*

Stem 6–8 in., branched, erect, compressed. *Leaves* 3–5 by $\frac{1}{4}$–$\frac{1}{3}$ in., acuminate, glabrous or hairy; sheath ciliate; ligule of hairs. *Spikes* $\frac{1}{2}$–1 in., erect, rachis fragile, joints clavate shorter than the spikelets, tips ciliolate, side not hollowed. *Spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in., closely imbricating. Gl. I of *sessile spikelet* with a coriaceous 3–5-nerved disk and ciliate hyaline wings; II much smaller, ovate, 1-nerved; III ovate, obtuse, hyaline, nerveless; IV much smaller, broadly oblong, obtuse, nerveless, sides incurved, palea like the gl. nerveless. *Pedicelled spikelet* like the sessile, but smaller and less gibbous; pedicel pyriformly clavate, truncate, top scaberulous.

*** Gl. I of sessile spikelet winged at the tip only or narrowly on the margins.*

11. **R. exaltata,** *Linn. f. Suppl.* 114; annual, leaf-base narrow rounded tip setaceous, gl. I of sessile spikelet very coriaceous about as long as the joint obtuse hardly margined or winged dorsally flat smooth, pedicels of upper spikelet shorter than the joints. *Kunth Enum. Pl.* i. 466; *Hack. Monogr. Androp.* 294; *Steud. Syn. Gram.* 361; *Roxb. Corom. Pl.* ii. 30, t. 157, *Fl. Ind.* i. 354; *Grah. Cat. Bomb. Pl.* 233; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107; *Aitchis. Cat. Panjab. Pl.* 172; *Duthie Grass. N.W. Ind.* 17; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 196; *Miq. Fl. Ind. Bat.* iii. 406; *Br. Prodr.* 206; *Benth. Fl. Austral.* vii. 513; *Baker Fl. Maurit.* 457; *Wall. Cat.* n. 8875; *Wight Cat.* n. 1724, *Herb.* n. 3286. R. arundinacea, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 444; *Steud. l. c.* 362. R. denudata, *Steud.*; *Miq. l. c.* 408. R. gymnorhiza, *Herb. Ham. ex Wall. Cat.* n. 8875. R. hispida, *Herb. Roxb.* R. setosa, *Presl Rel. Hænk.* i. 329. Ophiurus appendiculatus, *Steud. l. c.* 359. Stegoasia cochinchinensis, *Lour. Fl. Cochinch.* 51.

Plains and lower hills of INDIA, from the N.W. Provinces to ASSAM and BURMA (ascending the HIMALAYA in Garwhal to 7000 ft.), and southward to Travancore and CEYLON. ANDAMAN ISLDS., *Prain.*—DISTRIB. China, Malaya, Australia, Africa.

Stems 6–10 ft., stout, erect, spongy within, as thick as the little finger below and hispid. *Leaves* 6–24 by $\frac{1}{4}$–1 in., linear-lanceolate, setaceously acuminate, scabrid or hispid above, margins scabrid; sheath hispid with tubercle-based hairs or glabrate. *Spikes* 3–6 in., stout, cylindric below, much narrowed with imperfect spikelets above; joints smooth, scaberulous. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in.; gl. I ovate-oblong, 2-fld., keels scaberulous narrowly winged, entire or emarginate; II broadly ovate, chartaceous, convex, 9–11-nerved, keel scabrid; III elliptic, 3-nerved, male, margins inflexed; IV shorter, convex, ovate, acute or mucronate. *Pedicelled spikelets* with the pedicel usually adnate by one margin to the joint, 1–2-fld. or neuter.

Var. *robusta*; leaf-base more cordately confluent with the sheath, spikes stouter below, slender above the middle, spikelets in upper half distichously imbricate longer than the joints, fertile nearly to the tip, palea of gl. IV auricled at the base.—Malabar and at Palamcotta, *Wight Herb.* n. 3286; *Wall. Cat.* n. 8875 E. Poona, *Woodrow.*

12. **R. nigrescens,** *Thw. Enum. Pl. Zeyl.* 364; leaf-base cordate, spike fragile, gl. I of sessile spikelet ovate-oblong very obtuse or 3-lobulate dorsally tessellately foveolate obscurely 2-winged in the upper third or tip. *Hack. Monogr. Androp.* 296; *Trim. Cat. Ceyl. Pl.* 107.

CEYLON; Central Province, alt. 4000 ft., *Thwaites.*

Stem tall, suberect, slender, glabrous. *Leaves* 4–8 in., linear-lanceolate, glabrous or sparsely hairy, margins scabrid, base ciliate; sheath glabrous or sparsely hirsute; ligule rounded, ciliate. *Spikes* 2–3 in., solitary or 2-nate, axillary and terminal; joints as long as the spikelet, stout, margins smooth. *Sessile spikelets* $\frac{1}{6}$ in., ovate-oblong; gl. I ovate, 9-nerved, wings scarious; II elliptic, obtuse, gibbous, keel winged below the tip; III hyaline, oblong, obtuse, paleate, nerveless; IV elliptic, obtuse, emarginate. *Pedicelled spikelets*; gl. I smooth, striate, winged above on one side, 7–9-nerved; II 5-nerved, keel excentric, winged; III and IV as in the sessile spikelet; pedicel adnate to the joint.

13. **R. striata,** *Nees ex Steud. Syn. Gram.* 361; leaf-base narrowed, spikes fascicled, often on very long peduncles, gl. I of sessile spikelet oblong-lanceolate shortly winged below the tip dorsally smooth with 4–6 often interrupted grooves below the middle. *Hack. Monogr. Androp.* 301.—*Wall. Cat.* n. 8876, 8877.

SIKKIM HIMALAYA, alt. 1–4000 ft., *J. D. H.*, &c. SILHET and the KHASIA HILLS, *Wallich*, &c. BURMA and SINGAPORE, *Wallich*, &c.

Stem 3–4 ft., slender, thickened under the spikes, smooth, branched above. *Leaves* 2–4 ft. by $\frac{1}{3}$–2 in., linear-lanceolate, setaceously acuminate, flat, midrib broad; sheaths glabrous, upper spathiform; ligule very short, membranous. *Spikes* 1–2 in., pale, slender, terete, glabrous. *Sessile spikelets* as long as the joints; callus annular, glabrous; gl. I obtuse, convex, many-nerved within, keels smooth; II chartaceous, ovate, subacute, acutely keeled, 1-nerved; III ovate, acute, hyaline, nerveless, paleate; IV ovate, faintly 1-nerved. *Pedicel of upper spikelet* linear, flattened, free or $\frac{1}{2}$ or wholly adnate to the joint, tip hollowed, circular or compressed. Hackel has two subspecies.

Subsp. *genuina*; leaves 1–2 ft. by $\frac{1}{3}$–$\frac{2}{3}$ in., spikes in a simple lax panicle, joints of rachis scaberulous, sessile spikelets $\frac{1}{5}$ in., pedicelled spikelets of one long obtuse glume winged on one side.—Of this there are two vars., *α. glabrior*, stems and surfaces of leaves quite glabrous, margin of leaves and sheaths ciliate.—Singapore and Tavoy; and *β. pubescens*, stem above and surfaces of leaves pubescent.—Khasia Hills.

Subsp. *khasiana*; stem very tall much branched, leaves 3–4 ft. by 1–2 in., spikes 1–1½ in. in a compound panicle; joints smooth, sessile spikelets $\frac{1}{6}$ in., gl. I more broadly winged, pedicelled spikelet $\frac{1}{8}$ in., oblong. R. khasiana, *Munro mss.*—Sikkim and the Khasia Hills.

14. **R. glandulosa,** *Trin. in Mem. Acad. Petersb. Ser.* 6, ii. (1833) 250; perennial, spikes fragile, sessile spikelets ovate-lanceolate, gl. I narrowly winged in the upper third, dorsally scaberulous, margins below with on each side 5–7 upcurved mucros or tubercles. *Hack. Monogr. Androp.* 302; *Miq. Fl. Ind. Bat.* iii. 408. Cœlorachis muricata, *Brongn. in Duperr. Voy. Bot.* i. 65, t. 14. Ophiurus muricatulus, *Steud. in Zoll. Syst. Verz.* 57, *Syn. Gram.* 360.—Rottboellia ?, *Wall. Cat.* n. 8887 B.

BURMA, *Wallich.* MALAY PENINSULA; Singapore, *Wallich*; Malacca, *Griffith*; Perak, *King's Collector*; Pahang, *Ridley.*—DISTRIB. Java, Philippines.

Stem 3–8 ft., tall, stout, branched, nodes pubescent or bearded. *Leaves* 2–3 ft. by $\frac{1}{2}$–1 in., linear, caudate-acuminate, base usually fimbriate, margin scabridly serrulate; sheath bearded at the mouth; ligule densely hairy. *Spikes* many, 2½–4 in., slender, terete, pale or violet. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in., 1-fld., rather shorter than the glabrous joints; gl. I flat, obtuse, dorsally scaberulous; II charta-

ceous, elliptic-lanceolate, ciliolate; III ovate-oblong, obtuse; IV hyaline, 3-nerved; palea truncate, nerveless. *Pedicelled spikelets* reduced to a solitary gl. winged on one side, rarely with a second; pedicel adnate to the joint of the rachis.—A solitary specimen of a closely allied, I think, undescribed, species from Rangoon, *McLelland*, has caudate acuminate leaves, solitary spikes, sessile spikelets longer than the joints, gl. I narrowly oblong, margins smooth.

15. **R. Helferi,** *Hook. f.*; perennial, spikes solitary fragile subsessile in the sheaths, joints very short pyriform, sessile spikelets longer than the joints, gl. I ovate obtuse narrowly winged above the middle, back and sides smooth.

Tenasserim, *Helfer.*

Stem 1–2 ft., slender, erect, from a nodose stock, sparingly branched above; nodes faintly bearded. *Leaves* 1–2 ft. by $\frac{1}{3}$–$\frac{1}{2}$ in., erect, linear from a hardly narrowed base, finely acuminate, hairy on both surfaces; sheath glabrous, bearded at the tip. *Spikes* 1–4 in., slender, erect; joints $\frac{1}{12}$ in., excavate on one side, base shortly hairy. *Spikelets* $\frac{1}{8}$ in.; gl. I broadly ovate, narrowed suddenly above the middle, smooth, glabrous, or slightly pubescent on the sides below, wings serrulate; II ovate, acuminate, chartaceous, 1-nerved, keeled, faintly obliquely winged above, III broadly ovate, obtuse, hyaline, faintly 3-nerved, palea small 2-toothed; IV ovate, obtuse or subacute; palea broad, truncate, 2-nerved. *Pedicel* of upper spikelet longer than the joint, linear, flattened, strongly 2-nerved, ciliolate at the base; spikelet reduced to a minute ovate glume.

B. Sessile spikelets geminate in all but the uppermost joints of the spike.

Sect. V. Mnesithea, *Kunth* (genus).

16. **R. perforata,** *Roxb. Pl. Corom.* ii. 43, t. 182, *Fl. Ind.* i. 356; leaves very narrow, spikelets glabrous, pedicelled spikelets reduced to a minute gl. R. lævis, *Retz. Obs.* iii. 11; *Steud. Syn. Gram.* 362. Ophiurus perforatus, *Trin. in Mem. Acad. Petersb. Ser.* 6, ii. (1833) 246; *Hack. Monogr. Androp.* 319. O. lævis, *Benth. in Journ. Linn. Soc.* xix. (1881) 69; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 29; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 193. Mnesithea lævis, *Kunth Revis. Gram.* i. 154, *Enum. Pl.* i. 466, *Suppl.* 375, t. 18, f. 3; *Thw. Enum. Pl. Zeyl.* 364; *Wall. Cat.* n. 8873; *Wight Cat.* n. 1722; *Aitchis. Cat. Panjab. Pl.* 172. Hemarthria? perforata, *Kunth l. c.* 453, *Enum.* i. 465. Diperium cylindricum, *Desv. Opusc.* 76, t. 6, f. 3. Thyridostachyum læve, *Nees in Lindl. Introd. Nat. Syst. Ed.* II. 379. Ægilops cuneata, *Herb. Roxb.*

Throughout India, from the Indus to Burma and southward to Ceylon.—Distrib. Affghan., Java.

Stem 2–4 ft., rather slender, simple or branched above; nodes few. *Leaves* 6–30 by $\frac{1}{6}$ in., flat (conduplicate in vernation), linear from a narrow base, glabrous or base hairy, upper acute, lower obtuse, margins scaberulous; sheath terete; ligule very short. *Spikes* 4–8 in., shortly exserted, joints semi-cylindric, excavate on opposite sides with the pedicel of the imperfect spikelets between the opposite fertile spikelets. *Spikelets* $\frac{1}{7}$–$\frac{1}{5}$ in.; gl. I oblique, smooth or pitted above the base.

17. **R. merguensis,** *Hook. f.*; leaves $\frac{1}{4}$–$\frac{1}{2}$ in. broad, spikelets glabrous, pedicelled spikelet minute imperfect.

TENASSERIM; Mergui, *Griffith*, *Helfer*.

Habit of *R. perforata*, but at once distinguished by its greater size, and broad leaves which attain an inch in breadth with the tip finely acuminate, base rather narrowed, margins ciliate below the middle or towards the base only, both surfaces glabrous; sheath with glabrous or ciliate margins. *Spikes* 2–3 in., long peduncled; top of peduncle slightly clavate; joints $\frac{1}{8}$ in., about as long as the spikelets, clavate, quite smooth. *Sessile spikelets* ovate-oblong, winged at the top, quite smooth or with a few linear impressed pits, margins naked or obscurely ciliate.

18. **R. geminata,** *Hack. in Œstr. Bot. Zeit.* xli. (1891) 48; gl. I of sessile spikelets hirsute below with tubercle-based hairs.

MALAY PENINSULA; Pahang, *Ridley*.

Stems upwards of 2 ft. high, sparingly branched and flowering above; nodes bearded with reflexed hairs. *Leaves* 12 by $\frac{1}{8}$–$\frac{1}{5}$ in., linear, acuminate, rigidulous; sheaths appressed, mouths bearded; ligule short, membranous. *Spikes* about $2\frac{1}{2}$ by $\frac{1}{8}$ in., green, fragile; joints about $\frac{1}{4}$ in., shorter and as broad as the spikelets, clavate, dorsally convex, ventrally and the tops deeply hollowed. *Spikelets* $\frac{1}{6}$ in., separated by the narrow pedicel of the withering upper spikelets, dimidiate-ovate, glabrous, callus annular; gl. I coriaceous, acuminate, narrowly winged at the top on each side, margins narrowly inflexed, nerves many very slender, hairs white; II as long as I, ovate, subulate-acuminate, keeled, chartaceous; III shorter, hyaline, ovate, acuminate, empty, nerves 0; IV 1-nerved; palea like its gl.—Description from Hackel; I have not seen it.

UNDETERMINABLE SPECIES.

R. VILLOSA, *Poir. Encycl.* vi. 313; is, according to Hackel (*Monogr. Androp.* 313), probably an *Ischæmum* or *Andropogon*.

47. MANISURIS, *Sw.*

Annual, erect, much branched grasses. *Leaves* cordate at the base. *Spikes* terete, solitary, axillary and terminal, peduncles often confluent in a leafy spiciform panicle; rachis fragile; joints short, deeply excavate, tips with 2 pits. *Spikelets* 1–2-fld., in dissimilar pairs, one globose, sessile, bisexual; the other ovate, pedicelled, neuter, pedicel adnate to the joint of the rachis. *Sessile spikelet*; glumes 4, I hard, globose, foveolate, with an oblong opening opposite the rachis; II chartaceous, immersed in the cavity of I and filling the opening; III hyaline, empty; IV and its palea hyaline. *Lodicules* 2, broadly cuneate. *Anthers* minute. *Styles* free, stigmas short, exserted from the opening in gl. I. *Grain* subglobose. —Species 2, tropical.

1. **M. granularis,** *Linn. f. Nov. Gram. Gen.* 37, f. 7, fig. 4–7; sessile spikelets globose deeply pitted smooth between the pits, gl. II 1-nerved. *Sw. Prodr. Veg. Ind. Occ.* 25 (*partim*), *Fl. Ind. Occ.* i. 186; *Gærtn. Fruct.* ii. 468, t. 175; *Beauv. Agrost.* 119, t. 21, f. 10; *Roxb. Pl. Corom.* ii. 11, t. 118; *Kunth Enum. Pl.* i. 469; *Hack. Monogr. Androp.* 314; *Steud. Syn. Gram. Grah. Cat. Pl. Bomb.* 234; *Dalz. & Gibs. Bomb. Fl.* 300; *Griff. Notul.* iii. 101; *Thw. Enum. Pl. Zeyl.* 364; *Trim. Cat. Ceyl. Pl.* 107; *Duthie Grass. N.W. Ind.* 18, *Fodd. Grass. N. Ind.* 29, t. 46; *Lisboa in Journ. Bomb. Soc. Nat. Hist.* vi. (1891) 196; *Benth. Fl. Austral.* vii. 511; *Miq. Fl. Ind. Bat.* iii. 409; *Griseb. Fl. Brit. W. Ind.* 557; *Doell. in Mart. Fl. Bras.* ii. II. t. 46; *Wall. Cat.* n. 8879; *Wight Cat.* n. 1726. M. polystachya, *Beauv. Fl. Owar. & Ben.* i. 24, t. 14. M. hirta, *Herb. Russ. ex Wall. Cat. l. c.* Cenchrus granularis, *Linn. f. Mant.* ii. *App.* 575.

Throughout the hotter parts of INDIA, from the Panjab eastward to Burma, and southward to CEYLON.—DISTRIB. Most tropical countries.

Stem 1–2½ ft. and leaves softly hairy, leafy to the top, as thick as a crow-quill. *Leaves* 4–10 by ¼–½ in., flaccid, flat, acuminate; sheaths hirsute, inflated; ligule a raised ciliate margin. *Spikes* ¼–1 in.; peduncle filiform. *Sessile spikelets* $\frac{1}{16}$ in. diam., superposed like minute beads on the rachis, and each as it were bracteate by the upper spikelet of the pair below it.

2. **M. porifera,** *Hack. in Œstr. Bot. Zeitschr.* xli. (1891) 48; sessile spikelets broadly oblong truncate deeply broadly pitted, gl. I 5-nerved between transverse longitudinal ridges, II 3-nerved.

SIKKIM HIMALAYA; Dikeeling, alt. 3000 ft., *Clarke.* TENASSERIM, *Helfer.*

Habit and foliage, &c. of *M. granularis.* *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in., brownish; callus smooth or foveolate; gl. I excised at the base on both sides, leaving a rounded pore between it and the rachis.—There is a specimen of this in Herb. Wight, without name or locality.

48. **OPHIURUS,** *Gærtn.*

Annual or perennial grasses. *Spikes* solitary or fascicled, terete, fragile; joints excavate, top concave. *Spikelets* 2-fld., solitary and sessile in the joints (with no upper or pedicel of one), not awned. *Glumes* 4, I thickly coriaceous, convex, obtuse; II almost membranous, concave, keeled; III elliptic, obtuse, hyaline, faintly 2-nerved, margins infolded, paleate, male; IV as long as III, oblong, obtuse, -nerved, paleate bisexual, palea narrow; IV oblong, obtuse. *Lodicules* 2, cuneate. *Stamens* 3. *Grain* oblong, free. —Species one or two. Tropical Asiatic and African.

Ophiurus, as defined by Hackel and Bentham, is an artificial genus, of which the original species, *O. corymbosus*, has solitary sessile 2-fld. spikelets on each joint of the spike, with no obvious traces of a second, by which character it differs from *Rottboellia.* Of other Indian plants referred to it, *O. perforatus* (*Rottboellia perforata*, Roxb.) has 2 sessile 1-fld. spikelets on each joint of the spike, with a long interposed pedicel of a second perfect or imperfect one. It is the genus *Mnesithea* of Kunth. Two admitted species of *Rottboellia* have the same structure as *O. perforatus*, namely, *R. hirsuta*, Forsk., and *R. geminata*, Hack. These three should form either a separate genus (*Mnesithea*), or a section of *Rottboellia*, which latter course I have adopted. Hackel describes the joints of *O. corymbosus* as being thickened on one side by the presence of the confluent pedicel of a second spikelet, but I find no trace of this (nor can Dr. Stapf), and he describes *R. perforatus* as with one sessile spikelet on each joint, or with two on the lower joints only; but I find that in all the specimens two sessile spikelets is the normal condition almost throughout the spikes, the uppermost joints alone having but one.

O. corymbosus, *Gærtn. f. Fruct.* iii. 4, t. 181, f. 3 a (*Ophiuros*); *Kunth Enum. Pl.* i. 464; *Hack. Monogr. Androp.* 317; *Steud. Syn. Gram.* 359; *Wall. Cat.* n. 8874; *Wight Cat.* n. 1723; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 29, t. 55; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 193; *Benth. Fl. Austral.* vii. 512. Rottboellia corymbosa, *Linn. f. Suppl.* 114; *Roxb. Pl. Corom.* ii. 42, t. 181, *Fl. Ind.* i. 355; *Grah. Cat. Bomb. Pl.* 233. R. punctata, *Retz. Obs.* iii. 11. Ægilops exaltata, *Linn. Mant.* ii. *App.* 575; *Retz. l. c.* ii. 27.

Dry hills, ascending to 3500 ft. in the HIMALAYA and KHASIA HILLS, and southward to the DECCAN PENINSULA (not in Ceylon).—DISTRIB. Tonkin, Australia.

Perennial. *Stems* erect from a tuberous base, 5–6 ft., as thick as a goose-quill

below, solid, branching upwards, leafy throughout. *Leaves* ½–2 ft. by ½–1 in., flat (convolute in vernation), linear-lanceolate from a rounded base, finely acuminate, hairy above, margins spinulose; sheaths short, terete, upper leafless; ligule very short. *Spikes* corymbosely fascicled, 2–5 by $\frac{1}{12}$ in. diam., erect, often in very dense fascicles, shortly peduncled; joints as long and broad as the spikelets, tips obliquely truncate. *Spikelets* ovate-oblong, obtuse, glabrous; gl. I smooth or scrobiculate, at length recurved.

49. **RATZEBURGIA,** *Kunth.*

A tufted slender perennial grass. *Spikelets* 1-fld., superposed in opposite pairs on a slender simple compressed subfragile spike, each pair sessile on a joint of the rachis, dorsally strongly compressed and appressed face to face (looking like one), rachis prolonged along the margins of the pairs on one side, and with the rachilla of a neuter along the opposite edges. *Glumes* 4, I thickly coriaceous, flat, oblong, deeply pitted, terminated with 2 erect coriaceous wings, margins strongly tubercled; II thinly coriaceous, lanceolate, acute, glabrous; III oblong, obtuse, hyaline, epaleate; IV smaller, epaleate. *Lodicules* obliquely quadrate. *Anthers* 3, short. *Stigmas* long.

R. pulcherrima, *Kunth Revis. Gram.* ii. 487, *Enum. Pl.* i. 468; *Wall. Pl. As. Rar.* iii. 253, t. 273 (*Aikinia*), *Cat.* n. 8868; *Hack. Monogr. Androp.* 321. Ophiurus auriculatus. *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833), 246. Aikinia elegans, *Wall. l. c.*

Burma; at Paghan and the Petroleum Wells, *Wallich*; Upper Burma, *Collett.*

Stoloniferous; stem 6–18 in., geniculate and leafy below. *Leaves* 1–3 in., narrow, flat, margins thickened, tip rounded; sheath compressed; ligule short. *Spike* 1–2 in., ⅛ in. broad; peduncle very slender with 2–3 long-sheathed leaves below; joints and pedicels of neuter alike, incurved, obtusely angled, bearded along the inner angle and the hammer-headed top. *Spikelets* about ⅙ in.; wings of gl. I earlike, sub-lobed.

50. **ELIONURUS,** *Humb. & Bonpl.*

Aromatic grasses. *Spikes* solitary, subsimple, clothed with silky hairs, rachis flattened, jointed, fragile. *Spikelets* 2-nate, a sessile and pedicelled; joints compressed, margins thickened, tips obliquely truncate. *Sessile spikelets* dorsally compressed, 1-fld.; glumes 4, I coriaceous, entire or 2-fid, embracing II by its margins; II narrower, membranous; III hyaline, empty, paleate or not; IV small, hyaline, paleate or not, awn 0. *Lodicules* obliquely quadrate. *Anthers* 3, short. *Styles* short, free. *Grain* narrow, plano-convex, free.—Species about 15, tropical and subtropical.

Hackel observes that *Elionurus* differs from *Rottboellieæ* and agrees with *Euandropogoneæ* in the entire sessile spikelet falling away with the joint, whereas in *Rottboellieæ*, gl. I is removable and II and III persistent in the hollow of the joint. The Aromatic oil of *Elionurus* is contained in the glumes.

1. **E. Royleanus,** *Nees ex A. Rich. Tent. Fl. Abyss.* ii. 471; annual, dwarf, spikes corymbose each sheathed, gl. I of sessile spikelet lanceolate narrowed into a 2-fid beak, margins with penicillate tubercles, III and IV epaleate. *Hack. Monogr. Androp.* 343; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 28, t. 54. E. Grisebachii, *Schmidt Beitr. Fl. Ins. Cap. Verd.* 154. Rottboellia elegantissima, *Hochst. & Steud. ex Steud. Nom. Ed.* II. ii. 474. Andropogon elegantissimus & Grisebachii, *Steud. Syn. Gram.* 364, 365. Ratzeburgia Schimperi, *Steud. Nom. l. c.* 439.

Upper Gangetic Plain, *Royle*; Agra and Ettawah, *Duthie*; Delhi, *Clarke*.—Distrib. Arabia, Abyssinia, Cape Verd Islds.

Stems 4–12 in., slender, leafy, geniculate. *Leaves* 4–10 in., narrow, flat or convolute, glabrous or sparsely hairy, base fimbriate; lower sheaths terete, upper spathiform; ligule very short. *Spikes* 1–2 in., erect, clustered towards the top of the stem, stout, green or purple, each enclosed in a long narrow flattened acute sheath; joints bearded below the tip. *Sessile spikelets* ¼ in., erect; callus densely bearded; gl. I deeply 2-fid at the top, lobes linear ciliate divergent, sides with a row of large tubercles each carrying a pencil of long hairs; II membranous, linear-lanceolate, acuminate, 1-nerved; III shorter, oblong, acute, nerveless, glabrous, epaleate; IV much shorter, oblong, obtuse, 1-nerved or nerveless. *Pedicelled spikelets* ⅓ in., narrowed almost from the base into a long subulate ciliate blade; II cymbiform, glabrous, narrowed into a scabrid awn; III and IV 0, pedicel with one margin shortly ciliate.

2. **E. hirsutus,** *Munro ex Benth. in Journ. Linn. Soc.* xix. (1881) 68; perennial, spikes peduncled naked, gl. I of sessile spikelet narrowed into a long narrow flat 2-fid beak margins villous, gl. III and IV paleate. *Boiss. Fl. Orient.* v. 466; *Duthie Grass. N.W. Ind.* 17, *Fodd. Grass. N. Ind.* 28, t. 17. Rottboellia hirsuta, *Vahl Symb.* i. 11; *Del. Fl. Ægypt.* t. 14, f. 1; *Kunth Enum. Pl.* i. 467; *Hack. Monogr. Androp.* 311. Ischæmum hirsutum, *Nees ex Steud. Syn. Gram.* 361. I. mastucatum, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833), 298. Coelorachis hirsuta, *Brongn. in Duperr. Voy. Bot.* 68. Lasiurus hirsutus, *Boiss. Diagn. Fl. Or.* II. iv. (1859) 146. Saccharum hirsutum, *Forsk. Fl. Ægypt. Arab.* 16.

Northern Panjab; Jelalpoor on the Jhelum, *Jacquemont*; Peshawur, alt. 3500 ft., *Stewart*. Rajpootana; Multan, *Edgeworth*; Sind, *Stocks*.—Distrib. Westward to N. Africa.

Rootstock woody, branched. *Stems* 1–2½ ft., ascending from a branching base, stout, smooth, rigid. *Leaves* narrow, coriaceous, sheaths white. *Peduncle* 6–10 in., slender. *Spike* solitary, stout, 2–4 in., silvery silky all over. *Spikelets* imbricate, appressed to the rachis; gl. I of lateral spikelet divergent, narrowly lanceolate, coriaceous, 7–9-nerved; II ⅓ shorter, chartaceous, 5-nerved, aristately acuminate, awn scabrid; III hyaline, oblong, obtuse, faintly nerved, neuter, palea lanceolate, nerves scaberulous; IV oblong, obtuse, faintly 5-nerved, palea as of gl. III but smaller. *Pedicelled spikelet* smaller, erect; gls. shorter, flowerless.—Regarded by Hackell as an anomalous *Rottboellia*, and nearer to *Ischæmum* than to *Elionurus*, but neither in habit nor characters does it approach the *Rottboellieæ*; and is naturally, I think, an *Elionurus*, from other species of which it only differs in the paleate gls. III and IV.

51. CLEISTACHNE, *Benth.*

Tall perennial grasses. *Leaves* long, narrow, flat. *Spikelets* solitary, 1-fld., in an oblong contracted much branched panicle, linear-oblong, terete, hirsute, jointed on the branchlets of the panicle. *Glumes* 4, I and II narrow, rigidly coriaceous, obtuse, completely enveloping III and IV; III much smaller, narrow, hyaline, 2-nerved, margins inflexed ciliate; IV very short, hyaline, with a terminal stout twisted awn; palea minute, hyaline, ciliate. *Lodicules* cuneate, ciliate. *Anthers* 3, large, linear. *Styles* free, stigmas short. *Grain* obovate-oblong, compressed, free.—Species 3, the following and 2 African.

The affinities of this genus and of *Germainia* are with *Anthistiria*.

C. Stocksii, *Hook. f.*; ligule oblong, spikelets dark brown, margins of gl. IV entire, palea ovate obtuse.

MALABAR; on the Bababoodan Hills, *Stocks*, *Ritchie*.

Stem tall, stout, simple. *Leaves* 12–.6 by ½ in., finely acuminate, softly hairy, midrib stout, margins slightly thickened ciliolate; sheath terete; ligule coriaceous. *Panicle* 6–8 in., long-peduncled, suberect; rachis and branches sparsely ciliate, branchlets (pedicels of spikelets) strigose with bright yellow hairs. *Spikelets* ⅛ in., crowded; callus short, bearded; gl. I dark brown, obscurely many-nerved, hirsute, shining; II like I but narrower, nearly glabrous; III 2-nerved, margins infolded, tip hispid; IV a twisted awn ⅔–1 in. long, dilated at the base into a hyaline 3-nerved membrane embracing the minute palea.—Very closely allied to the African *C. sorghoides*, Benth., which differs in its very short ligule, golden yellow spikelets, usually 2-fid gl. IV, and transversely oblong ciliate palea.

52. **GERMAINIA,** *Balans. & Poitrass.*

Rigid perennial grasses. *Leaves* narrow. *Peduncles* erect, bearing terminal narrowly oblong naked heads of 4 male spikelets, forming an involucriform whorl round a few long-awned females. Male spikelets sessile, 2-fld., glumes 4; I linear-oblong, very coriaceous, truncate, many-nerved, dorsally convex; II rather longer but much narrower, membranous, narrowly lanceolate, 3-nerved; III hyaline, narrowly lanceolate, 1-nerved, diandrous, its palea (if present) as long as itself; IV hyaline, lanceolate, diandrous; palea as long. *Fem. spikelets* much smaller than the male, cylindric, obliquely inserted on a pedicel by an obconical bearded callus; glumes 3, I chartaceous, linear, truncate, convolute round the others; II similar, but shorter; III the long twisted awn which is slightly dilated at the very base; palea short, very broad, tip erose. *Lodicules* 0. *Anthers* 2, very long. *Styles* slender, stigmas long narrow. *Grain* closely wrapped in the glumes.—Species 3 or 4, Indian, African and Chinese.

1. **G. khasiana,** *Hack. in Œstr. Bot. Zeitschr.* xli. (1891) 50; leaves short linear-lanceolate quite glabrous, male spikelets sessile on the contracted tip of the peduncle, gl. I entire retuse or notched.

KHASIA HILLS; at Nurtiung and Poorung, alt. 4–4500 ft., *Clarke*.

Stems densely tufted, a foot high, erect, leafy, terminating in long slender peduncles. *Leaves* 1-2 in., narrow, acuminate, coriaceous, 1-nerved; ligule hardly any. *Heads* ½–⅔ in. long. *Gl. I* of male fl. polished, tip ciliolate; gl. I of bisexual spikelet scaberulous, tip ciliolate; awn of III 2 in. long.—Very near *G. capitata*, Bal. & Poitr. of China, and probably only a form of that plant, which has rather larger heads and its gl. I has a semicircular retuse tip with a sharp tooth on each side.

2. **G. lanipes,** *Hook. f.*; leaves very long and narrowly linear sheaths at the base of the stem clothed with silvery wool, male spikelets superposed on a very short rachis.

TENASSERIM, *Helfer*.

I have examined very scanty material of this curious species, which differs from *G. khasiana* in the short stout rootstock with very thick roots, clothed for an inch or more with snowy wool, and radical leaves a ft. long by ⅛ in. broad.

52.[1] **COELARTHRON,** *Hook. f.*

(Genus not in *Clavis*, p. 5.)

A very slender, straggling, nearly glabrous grass. *Leaves* small, elliptic, acute at both ends. *Spikelets* 1-fld., binate, a sessile bisexual and a minute often imperfect pedicelled, secund and imbricating on the fragile rachis of

a solitary erect spike; lowest pair on the spike imperfect; joints of rachis shorter than the sessile spikelet, clavate, tubular, tip truncate open, mouth entire compressed. *Sessile spikelets* dorsally flattened; callus very short, bearded; gl. I ovate-oblong, tip narrowly truncate, dorsally glabrous with a deep median channel, margins narrowly inflexed above broadly incurved below, keels subpectinately ciliate above the middle; II cymbiform, 1-nerved, awned; III oblong, 1-nerved; IV very small, 2-fid, 3-nerved, awn slender, twisted; palea minute. *Lodicules* 2, cuneate-quadrate. *Stamens* 3. *Styles* 2. *Grain* fusiform. *Pedicelled spikelets* = $\frac{1}{2}$ the sessile or less, male or neuter gls. 2–3, not awned; pedicel linear, flat.

A remarkable grass, differing from *Andropogon* in the secund spikelets, hollow joints of the rachis, deeply channelled gl. I of the sessile spikelet (as in Sect. *Sehima* of *Ischæmum*), and the reduced pediceiled spikelets.

C. Brandisii, *Hook. f. in Hook. Ic. Plant. ined.*

BURMA; high ground, generally with Teak, *Brandis.*

Stems very weak, branching, struggling, rooting at the nodes, white; with ascending filiform 1–2-leaved flowering branches. *Leaves* 1–2 by $\frac{1}{6}$–$\frac{1}{4}$ in., inserted on the sheath by a mere point; acute or acuminate at both ends, membranous, flaccid, surfaces and margins quite smooth, midrib and nerves very slender; sheath glabrous; ligule oblong, obtuse. *Spike* 1–1$\frac{1}{2}$ in., strict or incurved, quite white. *Sessile spikelets* $\frac{1}{8}$ in.; gl. I with a strong median keel on the ventral surface; II notched at the tip, awn as long as the gl. or shorter, very slender, recurved; III flat, ciliate; awn of IV $\frac{3}{4}$ in., very slender, geniculate, column brown twisted, upper half very pale.

53. **ANDROPOGON,** *Linn.*

Grasses of various habit. *Leaves* usually narrow, base rarely rounded or cordate. *Inflorescence* of solitary binate digitate fascicled or panicled spikes (which are sometimes reduced to 3 spikelets), rachis articulate, usually fragile. *Spikelets* binate, a sessile fem. or bisexual, and a pedicelled male or neuter. *Sessile spikelet* 1-fld., glumes 4, I dorsally rarely laterally more or less compressed, margins inflexed or incurved, usually keeled; II as long as I, usually laterally compressed, awned or not; III hyaline, empty, 2-nerved or nerveless, epaleate; IV hyaline, broad or narrow, 2-fid and awned in the cleft or reduced to an awn more or less dilated at the base, paleate or not. *Lodicules* cuneate-quadrate. *Stamens* 3. *Stigmas* laterally exserted. *Grain* free. *Pedicelled spikelets* various, gls. 3–4, IV awnless.—Species about 200, chiefly tropical.

In this most difficult genus I have followed Hackel as closely as I could, not venturing to depart far from his grouping of the Indian species, to attempt which with any prospect of success would demand a revision of the whole genus. Hackel's two principal groups (Series), *Isozygi* and *Heterozygi*, unfortunately separate widely subgenera of close affinity in habit and in all other characters, except that adopted to distinguish between these groups. Thus the first two or even 4 subgenera of *Isozygi* are closely related to *Cymbopogon* amongst *Heterozygi*, and not to those that immediately follow them in the series. Added to this, on the one hand the characters drawn from the form, sexuality, &c., of the lower sessile spikelets of the *Heterozygi* as distinguishing them from those of *Isozygi* are often variable and very difficult of detection; and on the other hand the same characters do occur here and there in several subgenera of the latter group. With regard to Hackel's subgenera, they appear to me to be on the whole well constructed and natural, though often depending on characters, some inconstant, others difficult of detection or appreciation. Of the best defined I should, following older authors, have preferred to have treated

them as genera, especially *Chrysopogon*, *Cymbopogon* and *Heteropogon*; and his section *Pseudanthistiria* of subgen. *Hypoginium*, should certainly rank as a genus closely allied to *Anthistiria*.—The following is Hackel's grouping :—

Series I. Isozygi. Sessile spikelets of all the pairs alike in sex and form throughout the spikes.

* Peduncle of spikes enclosed in spathiform leaf-sheaths.

† Joints of rachis and pedicels of upper spikelets clavate or trumpet-shaped, top cupular with toothed margins.

§ Spikes solitary on the peduncle.

Pedicelled spikelets smaller than the sessile	1. Schizachyrium.
Peduncled spikelets larger than the sessile	2. Diectomis.
§§ Spikes 2 or more on the peduncle	3. Arthrolophis.
†† Joints of rachis and pedicels of upper spikelets slender, top obliquely truncate cupped or not	4. Hypogynium.
** Peduncles of spikes not enclosed in spathiform leaf-sheaths; joints of rachis slender.	
Joints of rachis and pedicels of upper spikelets linear compressed with usually a central translucent channel and thickened margins	5. Amphilophis.
Joints of rachis very few, filiform, opaque; lodicules ciliate; grain dorsally compressed	6. Sorghum.
Joints of rachis many, stout or slender, opaque	7. Vetiveria.
Joints of rachis few; spikes articulate on the obliquely truncate bearded tips of the branches of the panicle	8. Chrysopogon.

Series B. Heterozygi. Lowest one or more sessile spikelets differing from all those above it in sex or form.

Spikes many (rarely 1 or few) on the peduncle digitate, sessile spikelets dorsally compressed	9. Dichanthium.
Spikes binate on the peduncle which is enclosed in a spathiform sheath; sessile spikelet dorsally compressed	10. Cymbopogon.
Spikes solitary, lower pairs of spikelets very unlike the upper; upper sessile spikelets cylindric	11. Heteropogon.

Subgen. I. Schizachyrium, *Benth.* *Spikes* solitary; peduncle in a spathiform leaf-sheath; joints and pedicels clavate or bucciniform, mouths broad cupular irregularly toothed. *Sessile spikelets* dorsally compressed, callus short; gl. I keeled; II not awned; IV hyaline, 2-fid, awned in the cleft. *Pedicelled spikelets* usually small, imperfect and withering.

* *Annuals.*

1. **A. brevifolius,** *Sw. Prodr. Veg. Ind. Occ.* 26, *Fl. Ind. Occ.* i. 209; glabrous, stems slender straggling much branched leafy, leaves divaricate linear obtuse or subacute, spathes very narrowly linear spreading, spikes glabrous or sparsely hairy. *Kunth Revis. Gram.* ii. 563, t. 196, *Enum. Pl.* i. 488, *Suppl.* 399; *Steud. Syn. Gram.* 366; *Hack. Monogr. Androp.* 363; *& in Mart. Fl. Bras.* ii. III. 302; *Benth. Fl. Hongk.* 423; *Duthie Grass. N.W. Ind.* 19, *Fodd. Grass. N. Ind.* 34; *Griseb. Fl. Brit. W. Ind.* 538. A. debilis, *Kunth l. c.* A. flaccidus, *A. Rich. Tent. Fl. Abyss.* ii. 452. A. floridus, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 265. A. fragilis, *Br. Prodr.* 202; *Kunth Enum. l. c.* A. obtusifolius. *Poir. Encycl. Suppl.* i. 583. A. parviflorus, *Roxb. Fl. Ind.* i. 274. A. tenellus, *Presl Rel. Hænk.* i. 335. Pollinia fragilis & brevifolia, *Spreng, Syst.* i. 288, 289. P. vaginata, *Spreng. Pugill.* ii. 11. Schizachyrium, brevifolium, *Nees Agrost. Bras.* 332.—Andropogon, *Wall. Cat.* n. 8824–5–6. Batratherum, *Wall. l. c.* n. 8827.

Tropical Himalaya, from Kumaon to Sikkim, Behar, Central India,

Chittagong, Burma, the Nicobar Islds., and the Malay Peninsula.—Distrib. Tropics.

Stems 8–24 in., very many from the root, filiform, flaccid, geniculate, leafy throughout. *Leaves* 1–3 in., $\frac{1}{8}$–$\frac{1}{4}$ in. broad, flat, glabrous, margins and nerves beneath scabrid. *Spikes* numerous; peduncle capillary; spathes 1–1$\frac{1}{2}$ in.; flat; joints 5–10 as long as the sessile spikelet, and pedicels clavate, tips 2-toothed. *Sessile spikelets* $\frac{1}{6}$ in., linear-oblong; gl. I coriaceous, tip 2-fid; awn $\frac{1}{3}$–$\frac{1}{2}$ in. *Pedicelled spikelet* reduced to a long-awned glume.

2. **A. axilis,** *Hochst. in Flora*, xxvii. (1844) 241; slender, erect, fastigiately branched above, leaves very narrow acuminate, spathe erect narrowly lanceolate, spikes silkily villous. *Hack. Monogr. Androp.* 365. A. fragillimus, *Steud. Syn. Gram.* 384. A. fragilissimus, *Hochst. in Schimp. Pl. Abyss.* n. 2057. A. Petitianus, *A. Rich. Tent. Fl. Abyss.* ii. 451.

Bengal, Chota Nagpore, and the Central Provinces, *Clarke, Duthie,* &c.—Distrib. Afric. trop.

Stems short stout and densely tufted, or lax erect and 12–18 in. high, leafy. *Leaves* 1–3 in., erect, glabrous or sparsely hairy. *Spathes* 1–1$\frac{1}{2}$ in., slender; peduncles $\frac{1}{4}$–1 in., compressed. *Spikes* very slender; joints 8–12, about $\frac{1}{4}$ in. long, silkily ciliate, and pedicels thickened upwards, tips lunate. *Sessile spikelets* as long as the joints, subulate lanceolate; gl. I coriaceous, dorsally silkily villous, tip very slender bifid; II linear-lanceolate, 1-nerved, tip with a short bristle; IV bifid; awn $\frac{1}{3}$–$\frac{2}{3}$ in., very slender. *Pedicelled spikelet* subulate, silky; gl. I shortly awned, whole plant reddish when dry.

** *Perennials.*

3. **A. impressus,** *Hack. in Œstr. Bot. Zeit.* xli. (1891) 49; very slender, sparingly branched, leaves very narrow, joints of spikes 3–5 and pedicels very stout densely ciliate, gl. I of sessile spikelets glabrous lanceolate acuminate, deeply impressed between the scaberulous keels.

N.W. Himalaya; Kishtwar, *Clarke*, alt. 4000 ft.

Perennial. *Stems* erect; flowering branches distant. *Leaves* 4–8 in., setaceously acuminate; sheath short, smooth; ligule rounded. *Spathes* slender. *Spike* about 1 in., scarcely exserted; peduncle glabrous; joints and pedicels subclavate, shorter than the sessile spikelets, densely ciliate, tops obliquely cupped. *Sessile spikelets* $\frac{1}{5}$ in., linear-lanceolate, greenish, callus nearly glabrous; gl. I chartaceous, glabrous, tip 2-toothed, margins rather broadly inflexed; II lanceolate, acute, keeled, 3-nerved scabrid above; III oblong, obtuse, nerveless, ciliolate; IV oblong, cleft to below the middle, lobes glabrous; awn $\frac{1}{2}$–$\frac{2}{3}$ in., very slender, pale. *Pedicelled spikelets* very narrow, gl. I linear-lanceolate, acuminate, purplish, 9–11-nerved; II 3-nerved, acute; III 2-nerved, obtuse; IV 0.—Near *A. Alopecurus*, Hack. (of the Mauritius), which differs in the many-jointed spikes, in the 6–7-nerved gl. I which is more deeply channelled in the middle. The habit is that of a *Cymbopogon.*

4. **A. bootanensis,** *Hook. f.*; tall, stout, leaves very long, joints of spike few and pedicels long-ciliate, gl. I of sessile spikelets glabrous linear-oblong truncate dorsally convex keels obscurely winged above.

Bhotan Himalaya; Tassangsee, alt. 5–6000 ft., *Griffith.*

Perennial. *Leaves* 2–3 ft. narrowly linear, coriaceous, and sheaths smooth and glabrous. *Spike* $\frac{1}{2}$–$\frac{3}{4}$ in., peduncle subexserted from the very narrow spathe; joints and peduncles half as long as the sessile spikelet, rather slender, tips toothed. *Spikelets* red-brown, $\frac{1}{5}$ in.; callus bearded; gl. I nerves obscure; II coriaceous, acute, 1-nerved; III linear-oblong, ciliate, nerveless; IV short, lobes ciliate; awn very slender short; palea minute, ovate. *Pedicelled spikelet* like the sessile.—I

have seen but one specimen, it is allied to *A. impressus*, but is a much stouter plant, 3–4 ft. high.

5. **A. hirtiflorus,** *Kunth Revis. Gram.* ii. 569, t. 198, *Enum. Pl.* i. 489; erect, stiff, leaves linear rigid, spathes long-peduncled, spike 2–5 in. glabrous or nearly so, sessile spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. narrowly lanceolate. A. Pseudograyia, *Steud. Syn. Gram.* 365; *Hack. Monogr. Androp.* 370. A. zeylanicus, *Arn. ex Benth. Fl. Hongk.* 423; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 107. A. semiberbis, *Kunth Enum. l. c.* Rottboellia sanguinea, *Retz. Obs.* iii. 25. ?Pollinia fulta, *Desv. Opusc.* 69; *Hack. l. c.* 392. Thelepogon sanguineus, *Spreng. Syst.* i. 299. Schizachyrium zeylanicum, *Arn. l. c.* S. hirtiflorum and semiberbe, *Nees. Fl. Afr. Austr.* 334, 336.

KHASIA HILLS, alt. 4–5000 ft., *J. D. H. & T. T., Clarke.* BURMA, *Kurz.* CENTRAL PROVINCES, alt. 3–4000 ft. CEYLON.—DISTRIB. Tonkin, China, Madagascar, Trop. and S. Africa and America.

Perennial. *Stems* tufted, 1–4 ft., simple or sparingly branched upwards, as thick as a crow-quill or less, smooth, shining. *Leaves* chiefly radical, 2–6 in. by $\frac{1}{8}$–$\frac{1}{6}$ in., obtuse acute or acuminate; sheath compressed. *Spathes* 1–2 in., linear-lanceolate, acuminate. *Spike* stout, very narrow, subterete; rachis stout, shining, joints shorter than the sessile spikelets, outer or both margins ciliolate, tip hollowed strongly toothed. *Sessile spikelets* $\frac{1}{3}$ in., very narrow, half sunk in the concave faces of the joints; gl. I narrowly lanceolate, bicuspidate, dorsally rounded, faintly 5-nerved; II lanceolate, acuminate, with a gibbous base, and a narrow ciliate dorsal wing above the middle; III linear-oblong, acute, fimbriate; IV lobes narrow, acuminate, awn about $\frac{1}{2}$ in. *Pedicelled spikelets,* gl. I flat, subulate, awned, margins inflexed; II short, oblong.—Dr. Stapf has identified the Indian *A. Pseudograyia* with its American and African species cited above, of which I have not given all the synonyms, which will be found in Hackel's Monograph.

Subgen. II. DIECTOMIS, *Hack.* *Spikes* solitary; peduncle in the axil of a spathiform leaf-sheath, joints and pedicels bucciniform, mouths toothed. *Sessile spikelets* laterally compressed, callus short; gl. I accumbent, keeled, II much broader long-awned; IV 2-toothed, awned in the sinus. *Pedicelled spikelet* twice as long and broad as the sessile and concealing it.

6. **A. fastigiatus,** *Sw. Prodr. Veg. Ind. Occ.* 26, *Fl. Ind. Occ.* i. 207; *Hack. Monogr. Androp.* 393; *Griseb. Fl. Brit. W. Ind.* 559. A. diatherus, *Hochst. in Schimp. Pl. Abyss.* n. 2013 (*non Steud.*). A. Hochstetteri. *Steud. Syn. Gram.* 384. Diectomis fastigiata, *H. B. & K. Nov. Gen. & Sp.* i. t. 64 (*excl. Syn. Beauv.*); *Kunth in Mem. Mus. Par.* ii. (1815) 69; *Nees Agrost. Bras.* 340 (*non Beauv.*); *Hack. in Mart. Fl. Bras.* ii. II. 303. Pollinia fastigiata, *Spreng. Pugill.* ii. 13. Heteropogon Hochstetteri, *Anderss. in Schweinf. Beitr. Fl. Æthiop.* 310.

BERAR; near Gya and Chota Nagpore, *Clarke, Duthie.* TENASSERIM, *Helfer.* —DISTRIB. Tonkin, China, Afr. and Amer. trop.

Perennial. *Stem* erect 6 in. to 3 ft., or decumbent below and fastigiately branched upwards, leafy. *Leaves* 3–12 in., narrowly linear, acuminate, scabrid; ligule elongate, acute. *Spathes* 2–3 in., linear-lanceolate, often very slender; peduncle variable, tip cupular. *Spikes* solitary, 1–2 in., fragile, joints much shorter than the spikelets, villous with white hairs, tip broad strongly toothed. *Sessile spikelet* $\frac{1}{6}$–$\frac{1}{5}$ in., oblong; callus hairs = $\frac{1}{2}$ the spikelets; gl. I linear-lanceolate, bicuspidate and keeled, margins thickened, ciliate towards the top; II shorter, cymbiform, 2-fid, awned between the short obtuse lobes, dorsally keeled and ciliate above, awn much longer than the spikelets; III linear-oblong, margins ciliate; IV cymbiform, 2-toothed, with a stout dorsal awn from below the tip; palea minute, hyaline. *Pedicelled*

spikelets neuter; gl. I ovate-lanceolate, twisted, acuminate, 2 cuspidate and awned, ciliate, green, many-nerved; II much smaller, thin, acuminate, awned, III still smaller, oblong, hyaline.—I have examined spikelets of the type of *Homœatherum chinense*, Nees in Hook. & Arn. Bot. Beech. Voy. 239, which is certainly not *Androp. apricus*, as supposed by Hackel, but very close to *A. fastigiatus*, if not the same.

Subgen. III. HYPOGYNIUM, *Hack.* *Spikes* solitary, peduncled in the axil of a spathiform leaf-sheath; joints and pedicels slender, tops obliquely truncate. *Sessile spikelets* dorsally compressed; gl. I with inflexed or involute keeled margins; II keeled, awnless; III hyaline or 0; IV a simple awn (in the Indian species). *Pedicelled spikelets* like the sessile.

Hackel's section *Pseudanthistiria* forms one of the most distinct genera of *Andropogoneæ*, with characters of inflorescence and spikelets totally at variance with his characters of *Hypogynium*. He however observes its affinity with *Anthistiria*, near to which genus I place it.

7. **A. foveolatus,** *Del. Fl. Egypt.* 16a, t. 8, f. 2; densely tufted, basal sheaths silkily villous, spikes 3–6 elongate erect, gl. I of sessile spikelet smooth with usually a deep dorsal pit. *Kunth Enum. Pl.* i. 490; *Hack. Monogr. Androp.* 402; *Duthie Grass. N.W. Ind.* 20, *Fodd. Grass. N. Ind.* 34, t. 21; *Aitchis. Cat. Panjab. Pl.* 176. A. strictus, *Roxb. Fl. Ind.* i. 260. A. Orthos, *Schult. Mant.* ii. 455. A. monostachyus, *Spreng. Pugill.* ii. 9. A. ramosus, *Heyne ex Wall. Cat.* n. 8802.—Andropogon, *Wall. Cat.* 8802.

Drier parts of INDIA, from the Panjab and Sind to Bengal, CHOTA NAGPORE, CENTRAL PROVINCES, CIRCARS and COROMANDEL.—DISTRIB. Westwards to the Cape de Verd Islds.

Stem 1–2 ft., simple or subfastigiately branched above, as thick as a sparrow's quill; nodes sparingly bearded. *Leaves* very narrow, sometimes almost filiform, rigid, scaberulous beneath, sheaths shorter than the internodes, scabrous or glabrous; ligule short, truncate, hyaline, ciliolate. *Spikes* 1–1½ in.; peduncles capillary, erect, usually far exserted beyond the very slender spathe; joints and pedicels slender, villous. *Sessile* and *pedicelled spikelets* subequal ⅛–⅙ in., linear-oblong, subacute, purplish, glabrous except the shortly villous callus, shining; gl. I flat, 4–7-nerved, keels scabrid; II as long, 3-nerved, acute; III much shorter, glabrous, nerveless; IV awn ½–⅔ in. long, very faintly margined towards the base. *Pedicelled spikelet* rufous or purplish, neuter; gls. 2, I subacute, dorsally pitted or not, keels scabrid, 5-nerved, glabrous; II linear-lanceolate, acute, 3-nerved.

8. **A. tuberculatus,** *Hack. Monogr. Androp.* 404; tall, stout, basal sheaths glabrous, spikes solitary long-peduncled erect, gl. I of sessile spikelet lanceolate keels and nerves tubercled not pitted.

CENTRAL PROVINCES; in the Khandua and Betul districts, *Duthie*; Asinagarh, *Kuntze.*

Stem 4–6 ft., stout, stiff, pale yellow, shining, paniculately branched, nodes glabrous. *Leaves* 1–2 ft. by ⅛ in., rather rigid, glaucous, strongly closely nerved, setaceously acuminate, base narrowed, scabrid, midrib very broad; sheath quite smooth; ligule large, membranous, auricled. *Spikes* 1–1¾ in. *Panicle* leafy; spathes very narrow, scabrid with tubercle-based hairs; peduncle 2–4 in., strict, scabrid; joints and pedicels very slender, ciliate with long hairs. *Sessile spikelets* ⅕ in., linear-lanceolate, callus shortly bearded; gl. I lanceolate, tip narrowly truncate, dorsally flat, 3–7-nerved, margins narrowly inflexed, keels and nerves tuberculate; II membranous, lanceolate, acute, 1-nerved, ciliate; III linear, acute,

glabrous; IV awn $\frac{1}{2}$–$\frac{2}{3}$ in. *Pedicelled spikelets* male, gl. I strongly nerved; IV 0.—A very handsome grass.

Subgen. IV. ARTHROLOPHIS. *Spikes* 2-nate digitate or subpaniculate, on a common peduncle arising from a spathiform sheath; joints few or many, clavate or bucciniform (slender in *A. tristis*), tips cupular with toothed margins. *Sessile spikelets* dorsally compressed; gl. I not awned, margins inflexed, keeled; II dorsally keeled, awned or not; III hyaline; IV small, 2-fid with an interposed awn, or reduced to a simple awn. *Pedicelled spikelets* usually unlike the sessile; gl. I awned or not.—A heterogeneous assemblage.

* Joints of spikes and pedicels of upper spikelets rather slender; gl. II of sessile spikelet not awned.

9. **A. tristis,** *Nees ex Hack. Monogr. Androp.* 439; spikes 3–6 ununequal stipitate or subsessile on the peduncle, gl. I of sessile spikelet lanceolate deeply depressed between the thickened sides, IV very narrow 2-fid.

TEMPERATE WESTERN HIMALAYA, alt. 8–1000 ft., from Kashmir to Garwhal.

Stems 2–3 ft., compressed, tufted on a stout short or creeping rootstock, slender or rather stout, erect or geniculate below, branching above; nodes glabrous. *Leaves* 6–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., narrowly linear, scaberulous, rather rigid, hairy at the base; lower sheaths broad, compressed; ligule oblong, membranous. *Spikes* 1–3 in., livid green; peduncle 2–6 in., spathe very narrow; joints and pedicels = $\frac{3}{4}$ the sessile spikelet, hardly clavate, shortly ciliate. *Spikelets* loosely imbricate, sessile $\frac{1}{4}$ in., very narrow; callus hairs very short; gl. I more or less scaberulous margins broadly inflexed; II narrowly oblong, apiculate, ciliate, keel subscaberulous; III lanceolate, 2-nerved, ciliate; IV awn short or 0; palea minute, quadrate. *Pedicelled spikelets* as long as the sessile, gl. I 3–7-nerved; II 1–5-nerved; III hyaline; IV 2-fid and mucronate or 0, paleate or not.

** Joints of spikes and pedicels of upper spikelets clavate or bucciniform.

† *Gl. II of sessile spikelets awned.*

10. **A. apricus,** *Trin. in Mem. Acad. Petersb. Ser.* VI. iv. (1836) 83; tall, slender, leaves very narrow, spikes 2–5 hispidulous, joints and pedicels bucciniform, gl. I of sessile spikelets linear 2-cuspidate or 2-aristulate, II long-awned, IV bifid awned between the ciliate lobes. *Hack. in Mart. Fl. Bras.* ii. II 304. A. apricus *var.* indicus, *Hack. Monogr. Androp.* 457. A. ascinodis, *Clarke in Journ. Linn. Soc.* XXV. (1889) 87, t. 36.

KHASIA HILLS, alt. 2–3500 ft., *J. D. H. & T. T.* (*Herb. Ind. Or. Androp.* n. 4). MUNNEPORE; on Jackpho, alt. 7500 ft., *Clarke.* PEGU; in the Eng forest, *Kurz.*—DISTRIB. Trop. Africa and America.

Stem 3–5 ft., strict, sparingly branched upwards, quite smooth, nodes glabrous. *Leaves* 1–3 ft. by $\frac{1}{8}$–$\frac{1}{6}$ in., erect, coriaceous, glabrous except a few hairs at the base; sheaths very long, narrow, upper spathiform, very slender, tips setaceous, lower open; ligule oblong, obtuse, chartaceous. *Inflorescence* subpanicled; peduncle 2–4 in., filiform, puberulous, sheathed almost up to the spikes. *Spikes* $\frac{1}{2}$–1 in., very unequal in each fascicle, very shortly stipitate, hairs or cilia rigid setiform brownish, joints and pedicels half as long and as broad as the sessile spikelets, cuneately campanulate, base narrow, dorsally rounded, glabrous or scaberulous, sides ciliate with long hairs. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in.; callus conical, rigidly bearded; gl. I deeply channelled dorsally, keels scabrid above the middle, thickened below, nerves 2-nate at the keels; II 1-nerved, margins ciliate, keel setulose at the top, tip 2-fid, awn as long as itself; III linear, hyaline, broadly ciliate; IV shorter, oblong, 1-nerved;

awn 1 in. slender; palea small, linear-oblong, ciliate. *Pedicelled spikelets* narrower and rather smaller than the sessile, purplish; gl. I ovate-lanceolate, 2-cuspidate, keels long ciliate above the middle; II and III as in the sessile spikelet.—According to Hackel the Indian plant differs from the African in the longer hairs of the joints and pedicels and in the more exserted peduncle of the spikes, but I find that these and other minute characters are very inconstant. Homœatherum chinense, *Nees*, included under *A. apricus*, is, I think, certainly *A. fastigiatus*.

11. **A. longipes,** *Hack. in Flora* (1885) 138; annual, stem slender ascending, leaves linear and sheaths sparsely hirsute, spikes 2 both stipitate, peduncle naked (spathe 0), joints many and pedicels rather stout subclavate tips cupped shortly ciliate, sessile spikelets $\frac{1}{3}$ in. dorsally compressed oblong-lanceolate, gl. I broadly unequally winged above the middle aristulate, II long-awned, IV obovate cleft to the middle, awned between the lobes.

Nilghiri Hills, *Perrottet.*

Stems 12–16 in., decumbent below, nodes glabrous. *Leaves* 4–6 by $\frac{1}{8}$–$\frac{1}{5}$ in., hairs tubercle-based; ligule very short. *Spikes* 2–3 in., rather stout, dense-fld., green; joints and pedicels = $\frac{1}{2}$ the sessile spikelet, concavo-convex, margins rounded. *Spikelets* imbricating, callus short, obtuse, bearded; gl. I dorsally sparsely hairy and depressed or convex, many-nerved, wing produced beyond the summit serrulate; II ciliate, 3-nerved, lateral nerves submarginal, tip 2-toothed, keel scaberulous, awn as long as the gl.; III hyaline, 2-nerved, copiously ciliate; IV as long as III; lobes lanceolate, acuminate; awn $\frac{3}{4}$ in., glabrous. *Pedicelled spikelets* as long as the sessile, male; gl. I shortly awned, 6-7-nerved; II membranous, 3-nerved; III and IV linear-oblong, ciliate.—I have seen only one specimen. This, I think, is a doubtful member of the subgenus, the peduncle not arising from a distinct flattened spathe.

†† *Glume II of sessile spikelets not awned.*

12. **A. pumilus,** *Roxb. Fl. Ind.* i. 273; stem paniculately branched, leaves narrow, spikes in pairs, joints and pedicels clavate or trumpet-shaped, sessile spikelets dorsally compressed, gl. I very narrow lanceolate deeply channelled between the thickened keels, IV very narrow bisetose. *Kunth Enum. Pl.* i. 492; *Steud. Syn. Gram.* 388. A. demissus, *Steud. l. c.* A. geminatus, *Herb. Russ. ex Wall. Cat.* n. 8798 C. A. humilis, *Wight Cat.* n. 1701. A. caesius *a*, *Nees ex Wight l. c. n.* 1700. A. hirtus, *Heyne in Herb. Roth.* A. pachyarthrus, *Hack. Monogr. Androp.* 449; *Duthie Grass. N.W. Ind.* 21, *Fodd. Grass. N. Ind.* t. 39.—Andropogon, *Wall. Cat.* n. 8798, A. B. C., 8799.

Drier parts of India. Nepal, *Wallich, &c.*; from Banda in Rajpootana, and Surat to the Central Provinces and Coromandel.

Annual or perennial? *Stem* 6–18 in. high, slender, suberect or geniculate and decumbent below; nodes glabrous. *Leaves* 3–5 in., rarely $\frac{1}{6}$ in. broad, sometimes almost filiform, acuminate, glabrous; sheath compressed, keeled; ligule short, truncate. *Spikes* $\frac{1}{2}$–$\frac{2}{3}$ in., in pairs terminating a very slender peduncle which arises from a narrow flattened glabrous spathe $\frac{1}{4}$–$\frac{1}{2}$ in. long; joints 6–8 and pedicels shortly ciliate on one margin, tops dilated cupped with 2–3-toothed margins. *Sessile spikelets* $\frac{1}{6}$ in.; callus glabrous; gl. I membranous, acuminate, bicuspidate, lateral ribs often ending below in 2 tubercles; II as long, narrowly lanceolate, mucronate, coriaceous; III shorter, linear, hyaline, 2-nerved; IV very narrow, cleft into two capillary-lobes with an interposed capillary awn $\frac{1}{6}$–$\frac{1}{3}$ in. long; palea minute, oblong. *Pedicelled spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in., ovate-lanceolate, acuminate, 5-nerved; gls. 3. —An excellent figure amongst Roxburgh's drawings attests Hackel's *A. pachyarthrus* being *A. pumilus*. The peduncle of the spike is sometimes 2 in. long. Wallich's n. 8799 is very tall and slender, as if drawn up amongst other plants.

13. **A. Munroi,** *Clarke in Journ. Linn. Soc.* xxv. (1889) 87, t. 37 (*char. reform.*); tall, slender, leaves very narrow, spikes in a small open subsimple panicle terminating solitary capillary sheathed peduncles, joints and pedicels clavate shortly silkily ciliate, sessile spikelets lanceolate, gl. I acuminate deeply hollowed between the thickened keels, IV very narrow bisetose.

North Munnepore, alt. 3500 ft., *Clarke.*

Stem 2–3 ft., sparingly branched upwards, slightly compressed, nodes glabrous. *Leaves* 6–10 by $\frac{1}{10}$ in., rather coriaceous, smooth, glabrous, nerves close-set, glaucous beneath with prominent midrib; sheath terete, smooth keeled; ligule rather long. *Spathe* 1–2½ in., very slender, terete, acuminate. *Panicle* 1–1½ in., as broad as long, of few irregular spreading branches. *Spikes* 4–8, ¼–¾ in. long, very shortly stipitate, solitary or 2–3-nate, divaricate or drooping, peduncle and pedicels of spikes smooth, glabrous; joints and pedicels of upper spikelets with irregularly toothed cupular tips; lowest pair of spikelets sometimes imperfect or male. *Spikelets* 4–6 pairs, $\frac{1}{6}$ in. long, laxly imbricating; sessile, callus shortly softly bearded; gl. I coriaceous, glabrous, shining, margins incurved, keels minutely scaberulous, nerves 0, or one vanishing below the middle; II acuminate, 3-nerved, keel ciliolate above the middle; III hyaline, ovate-oblong, 2-nerved, glabrous; IV as long as III, lobes subulate, awn ¼–¾ in., capillary; palea minute, truncate. *Pedicelled spikelets* male, gl. I linear-oblong, convex, subacute, 7–9-nerved; III acuminate, 3-nerved, glabrous; III as in the sessile spikelets; IV lanceolate.—The figure in Journ. Linn. Soc. gives the habit of the plant, but the description and analysis are very wrong. The former also errs in citing *Androp.* No. 4, Herb. Ind. or Hf. & T. under *A. Munroi*, it is *A. apricus.*

Subgen. V. Amphilophis, *Trin.* *Spikes* 2 or more fascicled or panicled, with many or few joints; joints and pedicels of upper spikelets narrow, linear, flattened, usually channelled and translucent between the thickened sides along the mesial line, terete and opaque in 21. *A. concanensis*, 27. *fasciculatus*, and 28. *venustus*, tips simply truncate. *Sessile spikelets* dorsally compressed; callus short; gl. I acutely 2-keeled; II keeled, awnless; III hyaline, epaleate; IV an awn with the base acute or very rarely dilated and 2-toothed or 2-fid. *Pedicelled spikelets* usually as long as the sessile, but narrower, many-nerved, and male.

A. Spikes with many pairs of spikelets.

* Pedicels of upper spikelets and joints of rachis slender, strongly compressed, with thickened margins and translucent centre.

† Spikes digitate or fascicled, not panicled, lower longer than the rachis of the inflorescence. (See also 24. *A. intermedius.*)

§ *Glume I of sessile spikelets more or less villous below the middle.* (*See also* 19. A. pertusus.)

14. **A. Ischæmum,** *Linn. Sp. Pl.* 1047; leaves narrowly linear, sheaths compressed, spikes 3–20 slender silky rachis glabrous, sessile spikelets ⅛–⅕ in., callus shortly bearded, gl. I oblong minutely truncate not pitted 5–7-nerved more or less appressedly hairy below the middle, keels rigidly ciliate. *Kunth Enum. Pl.* i. 499; *Host Gram. Austr.* ii. 3, t. 3; *Reichb. Ic. Fl. Germ.* t. 54; *Nees Gen. Fl. Germ. Monocot.* i. t. 92; *Steud. Syn. Gram.* 379; *Hack. Monogr. Androp.* 474; *Aitchis. Cat. Panjab Pl.* 176; *Duthie Grass. N.W. Ind.* 20, *Fodd. Grass. N. Ind.* 35, t. 23; *Benth. Fl. Austral.* vii. 531. A. angustifolius, *Sibth. & Sm. Prodr. Fl. Græc.* i. 47. A. annulatus, *F. Schmidt Fl. Cap. Verd.* 157. A. radicans,

Lehm. Ind. Sem. Hort. Hamb. 1828; *Nees Fl. Afr. Austr.* 106. A. villosus, *a, Lamk. Fl. Fr.* iii. 364.

North West India, from Kashmir and West Tibet to Kunawur, ascending to 12,000 ft.—Distrib. Westward to S. Europe, and tropics generally or sporadically.

Stems 2–3 ft., erect or geniculately ascending, subsimple, naked above; nodes naked or shortly bearded. *Leaves* 1–2 ft. by $\frac{1}{16}$–$\frac{1}{6}$ in., glabrous or hairy above, especially towards the base, glaucous, scaberulous above, base rounded; sheath loose; ligule very short. *Spikes* unequal, $1\frac{1}{2}$–3 in., shortly stipitate, usually purplish. *Sessile spikelets*, gl. I dorsally flat; II lanceolate, mucronulate, keels scabrid above; III oblong-lanceolate, acute, ciliate; IV awn $\frac{1}{2}$–$\frac{3}{4}$ in. *Pedicelled spikelets* usually darker than the sessile, male; gl. I lanceolate, 9-nerved, glabrous, keels ciliate above; II linear-lanceolate, 5–7-nerved; III linear-oblong, obtuse, ciliate; IV very narrow.

15. **A. Pseudischæmum,** *Nees ex Steud. Syn. Gram.* 380; tall, nodes bearded, leaves narrow pruinose beneath, sheaths terete, spikes 4–6 stipitate slender flexuous, rachis smooth, joints and pedicels a little shorter than the spikelets silky, sessile spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. lanceolate, callus hairs very short, gl. I imperforate sparsely silkily villous below the middle 7–9-nerved, keels ciliate. *Hack. Monogr. Androp.* 477. A. annulatus & quinqueflorus, *Heyne in Herb. Rottl.* A. Ischæmum, *Roxb. Fl. Ind.* i. 264. A. oryzetorum, *Hack. l. c.* A. pentastachyus & undulatus, *Heyne ex Wall. Cat.* n. 8815 A. A. scandens, *Thw. Enum. Pl. Zeyl.* 368 (*non Roxb.*); *Trim. Cat. Ceyl. Pl.* 107.

The Deccan Peninsula, *Heyne*, &c. Coromandel, *Roxburgh.* Ceylon, *Thwaites.*

Stem 2–3 ft., terete glabrous. *Leaves* 6–10 by $\frac{1}{6}$–$\frac{1}{3}$ in., glabrous or fimbriate with long hairs towards the base, upper surface and margins scabrid, lower glaucously pruinose, lateral nerves prominent; upper margins of the sheath membranous; ligule very short, ovate, membranous. *Spikes* flexuous or erect, 2–4 in. long, dull green, subracemose, common rachis smooth, axils bearded, special peduncles $\frac{1}{4}$–$\frac{1}{2}$ in.; joints and pedicels slender. *Sessile spikelets* $\frac{1}{7}$–$\frac{1}{5}$ in.; gl. I minutely truncate, tip hyaline, keels closely ciliolate and with a few long marginal hairs; II ciliate, 3-nerved; III hyaline, oblong, ciliate, 2-nerved or nerveless; IV awn $\frac{1}{2}$–$\frac{2}{3}$ in., base obscurely dilated, palea 0. *Pedicelled spikelets* longer than the sessile, lanceolate, gl. I 9-nerved, glabrous dorsally, keels scaberulous and ciliate; II 5–7-nerved; III ovate-oblong; IV minute or 0.—The spikelets vary a good deal in size. The pruinose undersurface of the leaves is a very marked character. Roxburgh's figure of his *A. Ischæmum* has awns an inch long, but allowance must be made for native artists' work. I have seen only a single specimen of *A. oryzetorum*, the spikes are very long and flexuous. Hackel distinguishes it from *Pseudischæmum* by the leaves being scabrous on both surfaces, which they are not in the specimen I have examined.

16. **A. compressus**, *Hook. f.*; stem tall robust compressed, nodes glabrous, leaves long broad flat, sheaths compressed keeled, spikes very many densely subcorymbosely panicled pale flexuous silky, joints and pedicels very slender, sessile spikelets $\frac{1}{6}$ in. ovate-lanceolate, callus hairs = $\frac{1}{3}$–$\frac{1}{2}$ the spikelet, gl. I imperforate 5–7-nerved villous below the middle, keels minutely scabrid.

The Deccan, *Lisboa* (No. 6. *A. odoratus*), *Woodrow.*

Stem 3–4 ft., as thick as a goose-quill at the base, erect, sparingly branched, leafy. *Leaves* 1–$1\frac{1}{2}$ ft. by $\frac{1}{4}$–$\frac{1}{3}$ in., finely acuminate, slightly scaberulous on the margins and both surfaces, a little hairy towards the base; sheaths strongly compressed and acutely keeled, uppermost forming a lanceolate spathe 4–6 in. long to the base of the panicle; ligule a ciliate membrane. *Fascicles of spikes* 4–5 in. long,

erect, branches slender, lowermost ½ in. long, and rachis smooth. *Spikes* 1–2 in. branched at the base, firm, nearly white, callus-hairs ⅓ the length of the spikelet. *Sessile spikelets*, joints and pedicels about = ½ spikelet, centre hyaline, upper hairs reaching the top of the sessile spikelet; gl. I, thin, margin narrowly incurved, tip truncate, hyaline; II ovate, 1-nerved, tip hyaline; III shorter, ovate obtuse glabrous nerveless; IV awn about ⅓ in., inconspicuously margined below. *Pedicelled spikelets* narrower than the sessile, hairs of callus half their length; gl. I 9–11-nerved; II 3-nerved; III oblong, long-ciliate, nerveless.—Sent by Lisboa as *A. odoratus*, but apparently very different from the description of that plant and from the specimens received in the strongly compressed and acutely keeled sheaths, broad leaves and inflorescence.

17. **A. Woodrovii,** *Hook. f.*; stems tall erect compressed, nodes glabrous, leaves long, sheaths compressed, spikes erect stipitate fascicled strict silky, joints and pedicels slender ciliate with long erect hairs, sessile spikelets ⅛–⅙ in. oblong-lanceolate, callus hairs = ¼ of the spikelet, gl. I of sessile spikelet 8–12-nerved silky below the middle, tip truncate hyaline, keels ciliolate.

Bombay; Mawal, *Woodrow* (*Herb. Bombay*, n. 27).

Stems 3–4 ft., tufted on a woody rootstock, thicker than a goose-quill at the base and obtusely 2-edged, solid, stiff, branched above. *Leaves* 1–2 ft. by ⅛–⅙ in., rigid, surfaces and margins scaberulous, not pruinose beneath; sheath loose, keeled, quite smooth; ligule a truncate ciliate membrane. *Spikes* 3–5, ½–1 in. long, pale, on slender but stiff smooth proper peduncles, ⅛–½ in. long; joints and pedicels linear, margins silky, upper hairs half as long as the spikelet. *Sessile spikelets*, callus rather long, obtuse; gl. I coriaceous, glabrous above the middle, margins narrowly incurved, nerves slender; II chartaceous, 3-nerved, ciliate; III ovate, acute, nerveless, glabrous; IV a simple awn ½–⅔ in. *Pedicelled spikelets* narrower than the sessile; gl. I 9-nerved, glabrous, keels scabrid; II 3-nerved, ciliate; III obovate, ciliate, nerveless; IV 0.—Apparently a very distinct species, of which better specimens are much wanted, the spikes being much broken. Mr. Woodrow observes that the odour is that of camphor.

§§ *Glume I of sessile spikelets usually quite glabrous* (*or hairy below the middle in* A. pertusus).

18. **A. pertusus**, *Willd. Sp. Pl.* iv. 922; erect or ascending, nodes more or less bearded, leaves linear, sheaths terete, spikes 3–7 usually purple 1–2 in. digitately fascicled shortly stipitate slender silky, rachis fragile, joints and pedicels silkily ciliate, sessile spikelets ⅐–⅕ in. oblong-lanceolate minutely truncate usually shining glabrous or sparsely hairy below the middle 5–9-nerved usually 1–2-pitted dorsally callus shortly bearded, keels spinulosely ciliate above. *Beauv. Agrost.* 131, t. 23, f. 2; *Br. Prodr. Fl. Austral.* 201; *Roxb. Fl. Ind.* i. 258; *Kunth Enum. Pl.* i. 498; *Steud. Syn. Gram.* 364; *Hack. Monogr. Androp.* 479; *Wight Cat.* n. 1696; *Thw. Enum. Pl. Zeyl.* 367 (*excl. Syn.*) 437; *Trim. Cat. Ceyl Pl.* 108; *Aitchis. Cat. Panjab. Pl.* 176 (*excl. Syn.*); *Duthie Grass. N.W. Ind.* 21 (*excl. Syn*), *Fodd. Grass. N. Ind.* 38, t. 25; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891), 202; *Nees Fl. Afr. Austr.* 107; *Benth. Fl. Austral.* vii. 530; *Baker Fl. Maurit.* 445 (*excl. some Syns.*); *Boiss. Fl. Orient.* v. 464. A. angustifolius, *Parl. Fl. Palerm.* i. 269. A. panormitanus, *Parl. Fl. Ital.* i. 140. A. punctatus, *Aitchis. in Journ Linn. Soc.* xviii. (1881) 111 (*not of Roxb.*). Lepeocercis pertusa, *Hassk. Pl. Jav. Rar.* 52. Eleonurus pertusus, *Nees mss. ex Steud. l. c.* Holcus pertusus, *Linn. Mant.* ii. 301.—Andropogon, *Wall. Cat.* n. 8804 A. B. C. D.

Drier parts of INDIA; from the Panjab to Burma, and southward to CEYLON.—DISTRIB. Westwards to Sicily; trop. Asia, Africa, and Australia.

Very variable in habit and stature, rarely 12 in. high, tufted, annual or perennial; stem sometimes creeping and rooting, usually ascending from a leafy base, slender, even filiform; nodes sometimes densely bearded. *Leaves* 2–12 by $\frac{1}{12}$–$\frac{1}{6}$ in., acute or acuminate, glabrous except at the ciliate base, rarely hairy, surfaces scaberulous, dull green; sheath hardly compressed, glabrous or villous; ligule short, membranous, truncate. *Spikes* pale or purplish; joints and pedicels very slender = $\frac{1}{2}$ the sessile spikelet; gl. I of sessile spikelet subacute, coriaceous; II 1–3-nerved; III linear-oblong, obtuse, glabrous; IV, awn $\frac{1}{2}$–$\frac{3}{4}$ in., capillary, base slightly dilated; palea minute or 0. *Pedicelled spikelets* like the sessile, male or neuter; gl. I 7–13-nerved, glabrous, pitted or not, keels ciliolate throughout their length; II lanceolate, 5-nerved, ciliate; III linear-oblong, glabrous; IV short or 0.—Lisboa describes the spikelets as aromatic when crushed. Hackel has the following Indian varieties, all of which, except *longifolius*, are united by various intermediates.

α. *genuinus*; gl. I thin not shining more or less villous below the middle, spikes 3–9.—Common.

β. *Wightii*; sheaths villous, nodes long bearded, spikes about 15.—"Panvanasum," *Wight Cat.* n. 1696.

ε. *longifolius*; tall, erect, stout from a woody stock, 2–4 ft. high, nodes densely bearded, leaves 12–18 by $\frac{1}{4}$ in. hairy, sheaths hirsute, lower spikes branched, spikelets quite glabrous, gl. I of lower spikelet coriaceous. A. Arnottianus, *Nees in Wight Cat.* n. 2338.—Andropogon, *Wall. Cat.* n. 8803.—Ceylon? *Wight.*—A very different looking plant from the other forms of *A. pertusus*.

η. *insculptus*; sheaths glabrous, gl. I of sessile spikelets 1–2-pitted truncate, keels longer ciliate. A. insculptus, *A. Rich. Tent. Fl. Abyss.* ii. 458. A. bifoveolatus & subunifoveolatus, *Steud. Syn. Gram.* 380.—Not uncommon.

19. **A. Foulkesii,** *Hook. f.*; stem erect or ascending very slender, nodes glabrous, leaves narrowly linear, sheaths terete, spikes 3–6 1–1½ in. long digitately fascicled long-stipitate slender purplish, joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. oblong-lanceolate dorsally depressed in the middle line imperforate 7-nerved glabrous keels pectinately ciliate.

NILGHIRI HILLS, *Wight*; Kaity, *Foulkes*; Pykora, *King*.

Perennial. *Stem* 12–18 in. *Leaves* 6–10 by $\frac{1}{6}$–$\frac{1}{4}$ in., finely acuminate, glabrous or hispid on both surfaces with spreading hairs, midrib very strong; sheath glabrous, mouth and ligule villous with long hairs. *Spikes* 1–1½ in., special peduncles $\frac{1}{4}$–1 in., very slender, axils bearded with long soft hairs; joints and pedicels slender, flat with thickened margins and diaphanous centre. *Sessile spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in., tip 2-toothed, callus bearded; gl. I dorsally flattened or convex, nerves obscure or distinct; II acuminate, 3-nerved, keel scaberulous above, margins ciliate; III shorter, lanceolate, nerveless; IV awn $\frac{1}{2}$–$\frac{2}{3}$ in., capillary, palea 0. *Pedicelled spikelet* longer and narrower than the sessile; gl. I strongly 9-nerved.—Resembles *A. Ischœmum*, differing in the much shorter hairs of the joints and pedicels and glabrous spikelets.

20. **A. concanensis,** *Hook. f.*; slender, erect, leafy, leaves very narrow sheaths terete, nodes glabrous, spikes 5–8 2–2½ in. long loosely fascicled long-stipitate slender flexuous pale, joints and pedicels slender compressed not deeply sulcate sparsely shortly ciliate, spikelets $\frac{1}{8}$ in. ovate- or oblong-lanceolate narrowly truncate glabrous 7-nerved keels very shortly ciliate.

BOMBAY, *Woodrow* (*Herb. Bomb.* n. 28).

Perennial. *Stems* many from a nodose stock, 28–24 in., firm, smooth, terete, leafy. *Leaves* 8–10 by $\frac{1}{12}$–$\frac{1}{8}$ in., finely acuminate, smooth on both surfaces; sheaths

smooth; ligule a ridge. *Spikes* very pale, rachis and proper peduncles filiform, glabrous, the latter $\frac{1}{2}$–$\frac{3}{4}$ in. long, axils slightly bearded; joints and pedicels = $\frac{1}{2}$ the lower spikelet, compressed, hardly grooved and not translucent in the centre, sides not thickened. *Sessile spikelets* small, callus hairs = $\frac{1}{4}$ the gls.; gl. I thin, nerves very slender, keels ciliate with stiff very short bristles; II lanceolate, acuminate, ciliate, nerves 3 faint; III much smaller, oblong, obtuse, nerveless; IV, awn $\frac{1}{2}$ in., capillary, base slightly dilated. *Pedicelled spikelets* narrower than the sessile, gl. I 9-nerved; II and III as in the sessile; IV small, oblong, often unequally 2-fid, ciliate, nerveless.—Although the pedicels of the upper spikelets and joints of the rachis are not as in typical *Amphilophis*, this appears to be the position of *A. concanensis*.

21. **A. Kuntzeanus,** *Hack. Monogr. Androp.* 478; tall, nodes thickly bearded, leaves narrowly linear smooth, sheaths terete glabrous, spikes 12–15 $\frac{3}{4}$–2 in. long densely fascicled slender silky purplish, joints and pedicels plumosely ciliate with long hairs, sessile spikelets $\frac{1}{5}$ in. linear-lanceolate, callus hairs = $\frac{1}{2}$ the spikelets, gl. I pitted or not 7–9-nerved keels subpectinately ciliate towards the 2-toothed tip.

The CONCAN and CENTRAL PROVINCES, *Kuntze, Duthie.*

Stem 3–5 ft., as thick as a goose-quill below, with 2–3 slender flowering branches above, terete, smooth. *Leaves* 10 in. and upwards by $\frac{1}{6}$–$\frac{1}{4}$ in., glabrous, glaucous, smooth, margins scaberulous, upper cauline short, rigid. *Spikes* corymbose, slender, flexuous, proper peduncles $\frac{1}{4}$–$\frac{1}{3}$ in., slender, glabrous; joints and pedicels = $\frac{1}{2}$ the lower spikelet or more, translucent in the middle line. *Sessile spikelets* narrow; gl. I quite glabrous, thin; II lanceolate, acuminate or mucronate, margins ciliolate; III lanceolate, glabrous; IV awn about $\frac{1}{2}$ in., base somewhat dilated. *Pedicelled spikelets* narrower than the sessile, male; gl. I strongly 9–11-nerved, keels ciliate scabrid at the entire tip; II 5-nerved; III ovate-oblong ciliate, nerveless; IV small, linear, or 0.

22. **A. ensiformis,** *Hook. f.*; stem erect stout compressed, nodes glabrous, leaves erect strict narrowly ensiform acuminate, sheath strongly compressed, spikes many in a thyrsiform fascicle shortly stipitate, joints and pedicels silky with long hairs, sessile spikelets $\frac{1}{5}$ in. ovate-oblong, callus hairs = $\frac{1}{2}$ the spikelet, gl. I membranous dorsally flat 5–7-nerved very sparsely silkily villous towards the base, tip truncate keels minutely ciliate.

The CONCAN? *Dalzell.*

Stems 2 ft. and upwards, densely tufted, base as thick as the thumb, with stout roots, clothed with the compressed equitant leaf-sheaths. *Leaves* 8–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., rigid, strongly nerved, glabrous or sparsely hairy, tips acicular, margins and both surfaces scaberulous; sheaths smooth, lower equitant; ligule short, scarious. *Spikes* $\frac{1}{2}$–$\frac{2}{3}$ in., in an erect narrow thyrsus 3 in. long, pale purplish, proper peduncles $\frac{1}{6}$–$\frac{1}{4}$ in.; joints and pedicels very slender, flat with a translucent channel, ciliate with very long erect hairs. *Sessile spikelets*, callus small; gl. I thin, shining, margins rather narrowly incurved, keels slender; II ovate-oblong, acute, 3-nerved, ciliate, not keeled; III narrowly oblong, ciliate; IV a very narrow entire or 2-toothed membranous dilatation of the base of the slender awn, which is $\frac{1}{2}$–$\frac{2}{3}$ in. long. *Pedicelled spikelets* as long as the sessile, linear-oblong; callus naked; gl. I convex, many-nerved; II 5-nerved; III linear-oblong, ciliolate; IV 0.—I have seen only a single specimen from the Herbarium of the late Mr. A. Dalzell, with no locality marked. The straight sword-shaped leaves are remarkable.

†† Spikes racemed or panicled, lower much shorter than the rachis of the inflorescence.

23. **A. intermedius,** *Br. Prodr.* 20; inodorous, tall, leaves narrowly

linear, sheaths terete, rachis and branches of panicle glabrous, spikes fragile, joints and pedicels slender densely ciliate, sessile spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. oblong-lanceolate acute, callus hairs very short, gl. I of sessile spikelets glabrous or sparsely hairy or hispid below pitted or not, keels scabrid towards the tip. *Kunth Enum. Pl.* i. 500; *Steud. Syn. Gram.* 392; *Hack. Monogr. Androp.* 485; *Lisboa in Bomb. Journ. Nat. Hist.* iv. (1889), & vi. (1891) 69, 202. A. pertusus, *Thw. Enum. Pl. Zeyl.* 367 (*in part*). ? A. Pseudischæmum, *Duthie Grass. N.W. Ind.* 21, *Fodd. Grass. N. Ind.* 88. A. fascicularis, *Thw. l. c.* 437; *Trim. Cat. Ceyl. Pl.* 108; *Benth. Fl. Austral.* vii. 531. Holcus montanus, *Herb. Ham. ex Wall. Cat.* n. 8805 C.—Andropogon, *Wall. Cat.* n. 8804 E, 8805, 8806, 8815 C.

Throughout INDIA, from the Panjab (ascending the Western Himalaya to 8000 ft.) to Bengal and Arracan and southward to CEYLON.—DISTRIB. Westward to the Caucasus, China, Malaya, and the Pacific. Trop. Africa.

Perennial. *Stem* 3–5 ft., stout or slender, slightly flattened on one side; nodes glabrous or hairy. *Leaves* 6–18 by $\frac{1}{6}$–$\frac{1}{3}$ in., flat, glaucous, setaceously acuminate, ciliate towards the base; sheath hairy at the top; ligule very short, truncate. *Panicle* very variable in form and density, pyramidal thyrsiform or subcorymbose, rachis and branches glabrous the latter usually in opposite pairs; spikes variable in length. *Spikelets* pale green or purplish; gl. I rather thin, obtuse or narrowly truncate, 4-7-nerved; II oblong or lanceolate, 3-nerved, keel smooth, margins glabrous; III = $\frac{1}{2}$ I, oblong, glabrous, nerveless; IV a slender awn, 1–1$\frac{1}{2}$ in. long, palea 0.—*Pedicelled spikelets* linear-oblong or -lanceolate; gl. I 5–9-nerved, glabrous, keels ciliolate; II lanceolate, 3-nerved, ciliate; III shorter, oblong, glabrous, nerveless; IV 0.—A variable plant, nearest perhaps to a *Kuntzeanus* from which the paniculate inflorescence and smaller spikelets distinguish it. In some specimens the spikes are reduced to a few, and then the paniculate character disappears.

The following are Hackel's varieties of the Indian plant, which a larger series of specimens than he had access to tends to invalidate.—Roxburgh's *A. punctatus* and *A. glaber* (Anatherum glabrum, *Schult. Mant.* ii. 446) of both which there are good original drawings, do not fall under any of Hackel's vars. Both have pitted gl I; *A. glaber* has few spikes on the branches of the panicle, *A. punctatus* has many long quite simple spikes on a rather short rachis. Hackel has given a plant of Duthie's from Simla, 7–8000 ft., the mss. name of var. *himalayensis;* it is, I think, referable to var. *caucasicus*.

Var. *genuinus*; panicle 4–5 in. subsimple, branches with one or few spikes, gl. I not pitted appressedly hairy below, keels rigidly ciliolate. A. Vachelii, *Nees in Hook. & Arn. Bot. Beech. Voy.* 243. Kumaon, *Duthie* (*ex Hackel*).

Var. *Hœnkii*; panicle 5–6 in. compound, branches with 4–8 spikes, sessile spikelets $\frac{1}{8}$ in., gl. I rarely pitted slightly depressed along the middle line, keels rigidly ciliolate. A. Hœnkii, *Presl Rel. Hœnk.* i. 340. A. Vachelii, β, *Hook. & Arn. l. c.* A. leptanthus, *Steud. Syn.* i. 391. Rhaphis stricta, *Nees in Hook. Kew Journ.* ii. (1850) 99.—Ceylon (C.P. n. 411 *in part*).

Var. *caucasicus*; panicle 3–4 in. subsimple, branches simple or subdivided, sessile spikelets $\frac{1}{7}$ in., gl. I not pitted sparsely hispid below the middle. A. caucasicus, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 286. Sorghum caucasicum, *Griseb. in Ledeb. Fl. Ross.* iv. 476.—Black Mts., *Duthie.*

Var. *punctatus*; panicle 4–6 in. compound, branches with many spikes, sessile spikelets $\frac{1}{8}$–$\frac{1}{7}$ in., gl. I pitted sparsely hairy below the middle, keels rigidly ciliolate. A. punctatus, *Trin. Sp. Gram. Ic.* t. 328; *Steud. Syn. Gram.* 391 (*an Roxb.* ?). A. perfossus, *Nees ex Steud. l. c.*—Common.

? 25. **A. montanus,** *Roxb. Fl. Ind.* i. 267 (*non Benth. & Hackel*); tall, ascending from a stout creeping base, leaves long slender, panicle tall pyramidal, branches subverticilled capillary strict bearing one or several very slender elongate spikes, joints and pedicels sparsely hairy, spikelets

minute, gl. I not pitted sparsely hairy. *Kunth Enum. Pl.* i. 506. ? A. saccharoides, *Roxb. l. c.* 263 (*non Sw.*).

NORTHERN CIRCARS, *Roxburgh.*

Stem 3–4 ft., as thick as a large crow-quill, creeping and nodose below. *Leaves* remarkably long, a little hairy on the upper side near the base only; mouth of sheath bearded. *Panicle* 4–8 in., pale green.—There are two excellent drawings of this plant in Roxburgh's collection (Nos. 90 and 889) both marked *A. montanus*, in which the lower branches of the panicle are 3-nate, the rest alternate, all bearing several spikes of about an inch long. Two other of Roxburgh's drawings, n. 890 and 2017, of which the latter bears the name of *saccharoides*, represent a plant differing apparently from *montanum* only in the panicle being composed of simple shortly pedicelled much longer spikes. The difference between the two forms is analogous to what occurs in *A. intermedius*, from which *A. montanus* differs in the much more slender pale green panicle, and spikes with minute spikelets, and in the capillary joints and pedicels not being represented as compressed and as being laxly covered with distant long spreading hairs. As to this latter character, which is uniform in all four drawings, allowance must be made for native artists' work. I have seen no plant resembling this species, which is a native of a region botanically unexplored since Roxburgh's day. It has obviously no affinity with that which Hackel, following Bentham, has described as *montanus*, Roxb., and which plant Roxburgh probably never saw.

26. **A. odoratus,** *Dna. Lisboa in Journ. Bomb. Nat. Hist. Soc.* iv. (1889) 123, *cum Ic.* & vi. (1891) 68, 203; aromatic, stem stout, nodes villous, leaves long broad, sheaths compressed, spikes few or many densely fascicled stipitate silky purplish, rachis and branches glabrous, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in., callus densely silky, gl. I oblong-lanceolate truncate 7-nerved rarely pitted villous below the middle keels scaberulous.

The DECCAN; Khandeish, Poona, &c., *Lisboa.*

Stem 3–4 ft., as thick as a swan's quill at the base, sparingly branched, leafy. *Leaves* 1–2 ft., by $\frac{1}{6}$–$\frac{1}{3}$ in., flat, acuminate, scaberulous on both surfaces and on the margins, bright green, nerves strong; sheath long, glabrous, smooth, upper sheathing the base of the inflorescence; ligule membranous, truncate. *Panicle* 2–4 in.; branches filiform and spikes 1–2 in. suberect, slender, flexuous; spikes rather tenacious, joints and pedicels flattened with a translucent centre, tips truncate. *Sessile spikelets*, callus-hairs half as long as the gls.; gl. I thin, rarely pitted, nerves slender, tip truncate, hyaline, nerveless; II keeled, thin, obtuse or truncate, ciliate; III shorter than II, ovate-lanceolate, eciliate, nerveless; awn about $\frac{3}{4}$ in., faintly dilated towards the base. *Pedicelled spikelets* as long as the sessile or rather longer; gl. I narrow, many-nerved, dorsally glabrous; II 3-nerved, ciliate; III shorter, oblong, obtuse, nerveless, ciliate.—The compressed sheaths, panicled spikes, villous gl. I of the sessile spikelets, and aroma, seem to distinguish this from *A. Kuntzeanus*, which it strongly resembles in a dry state.

** Pedicels of upper spikelets and joints of rachis subterete, not or obscurely channelled, with no translucent centre. (See also 20. *concanensis.*)

27. **A. fascicularis,** *Roxb. Fl. Ind.* i. 265; annual, slender, leaves linear, sheaths hardly compressed, panicle oblong, branches subsolitary flowering almost to the base sparingly divided, spikes slender subsessile, joints and pedicels linear subterete or compressed not channelled shortly rigidly ciliate, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in., gl. I ovate-lanceolate flat smooth scabrous or shining 7–9-nerved keels shortly ciliate towards the

truncate tip. *Steud. Syn. Gram.* 392; *Hack. Monogr. Androp.* 541. A. gangeticus, *Hack. l. c.* 539.—Andropogon, *Wall. Cat.* n. 8816.

TROPICAL HIMALAYA, from Garwhal to Sikkim. LOWER BENGAL, ASSAM, the CENTRAL PROVINCES, and BURMA.—DISTRIB. Tonkin.

Stem 2–3 ft., decumbent and branched below, leafy, nodes glabrous or nearly so. *Leaves* 12–16 by $\frac{1}{6}$–$\frac{1}{3}$ in., glabrous or hairy, base narrowed, setaceously acuminate, scaberulous; sheath hirsute or subglabrous, mouth bearded; ligule shortly ovate. *Panicle* 1–2 in., long-peduncled, usually narrow, green or purplish; rachis slender, glabrous or nodes bearded; branches erect, lower usually binate covered to the base with spikes. *Spikes* $\frac{1}{4}$–$\frac{1}{2}$ in.; joints few, flattened but not 2-ribbed, ciliate with white or purple hairs. *Sessile spikelets* dorsally flattened, callus bearded; gls. thin, I glabrous on back and sides, margins involute, nerves very slender; II chartaceous, acute, 5–7-nerved; III lanceolate, 2-nerved, ciliate; IV much shorter, 2-fid, lobes triangular, ciliate; awn $\frac{1}{3}$ in. long; palea 0, or minute, broadly ovate. *Ovary* glabrous. *Pedicelled spikelets* neuter, narrower than the sessile; gl. I many-nerved, keels scaberulous; II acute, 7-nerved; III obovate-oblong, ciliate.—A good character of this species is the branches of the panicle bearing spikelets down close to the rachis. Hackel (who doubtfully places this in his subgenus *Sorghum*) describes gl. IV of the sessile spikelet as having a lanceolate acuminate glabrous nerveless palea as long as the gl.; no doubt an error.

28. **A. venustus,** *Thw. Enum. Pl. Zeyl.* 367; stems tall, leaves narrow, sheaths hardly compressed, panicle elongate interrupted, rachis and spreading opposite and alternate branches capillary glabrous, spikes small, joints 3–8 and pedicels very slender glabrous terete not channelled, sessile spikelets narrowly lanceolate acute, gl. I dorsally compressed nerveless tip 2-toothed, keels scabrid above the middle, II very shortly awned, keel smooth or scabrid upwards. *Hack. Monogr. Androp.* 545; *Trim. Cat. Ceyl. Pl.* 108.

CEYLON; Central Province, alt. 4000 ft., *Thwaites.*

Stem 2–4 ft., strict, subsimple, as thick as a goose-quill below and clothed with short pubescent sheaths. *Leaves* 12–16 in., smooth or scaberulous above, midrib very broad and prominent beneath; sheath subcompressed, smooth; ligule a ridge of hairs. *Panicle* 12–16 in., dull purplish, much branched. *Spikes* narrow, lax-fld., joints 3–8 and pedicels = $\frac{1}{3}$ the sessile spikelets. *Sessile spikelets* $\frac{1}{8}$ in., slightly curved; callus small, stellately bearded with white hairs; gl. I quite smooth, flat or rather convex dorsally; II chartaceous, linear-lanceolate, acuminate, 3-nerved, keel acute; III smaller, ovate, acuminate or aristulate, ciliate above, 1–3-nerved; IV linear, 2-fid, awn very slender. *Pedicelled spikelets* longer than the sessile and more acuminate, nearly glabrous, male; gl. I 7-nerved, 3 towards the margin on each side; II and III as in the sessile; IV narrow, glabrous, awn 0.—Hackel, who places this in subgen. *Vetiveria*, describes gl. I of the pedicelled spikelet as 5-nerved. The habit spikelets and glumes are those of subgen. *Amphilophis*, but the joints and pedicels are not channelled. Duthie (*Grass. N.W. Ind.* 22) gives the Jhelum Valley, *Stewart*, as a habitat, doubtless erroneously.

B. *Spikes* small, of 1–3- rarely 4 pairs of spikelets, often reduced to 3 spikelets, a sessile and 2 pedicelled. *Panicle* more or less pyramidal, rachis and branches capillary.

29. **A. micranthus,** *Kunth Revis. Gram.* i. 165, *Enum. Pl.* i. 504; stem erect or ascending simple or nearly so, leaves linear base hardly narrowed sheaths closed, spikes of 2–3 pairs of spikelets, joints and pedicels shortly ciliate or subglabrous, sessile spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I linear-oblong dorsally channelled glabrous scaberulous or villous, keels minutely subpectinately ciliate. *Steud. Syn. Gram.* 396; *Hack. Monogr.*

Androp. 488; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* iv. (1889), vi. (1891) 69. A. alternans, *Presl Reliq. Hænk.* i. 342; *Kunth Enum. l. c.* 502. A. cœrulescens, *Kunth l. c.* 504. A. capilliflorus, *Steud. in Zoll. Syst. Verz.* 58. A. parvispica, *Steud. l. c.* 397. A. serratus, *Miq. Prolus. Fl. Jap.* i. 192. Anatherum parviflorum, *Spreng. Syst.* i. 290. Chrysopogon violascens, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1893) 319. Sorghum parviflorum, *Beauv. ex Roem. & Sch. Syst.* ii. 840. Rhaphis cœrulescens, *Desv. Opusc.* 69. R. microstachya, *Nees ex Steud. l. c.* 397. Holcus cœrulescens, *Gaud. in Freyc. Voy. Bot.* 411, t. 27. H. parviflorus, *Br. Prodr.* 199.

Western Himalaya, from the Ravi to Kumaon, alt. 4–6000 ft. Khasia Hills, alt. 5000 ft., *Clarke*. The Nilghiri, Concan and Deccan Hills.—Distrib. E. Asia and Malaya, Australia, S. Africa.

Stem 2–3 ft., as thick as a crow-quill or thicker, terete, nodes more or less bearded. *Leaves* 6–12 by $\frac{1}{6}$–$\frac{1}{4}$ in., setaceously acuminate, flat, more or less hairy with tubercle-based hairs, surfaces and margins scaberulous, base rounded; sheaths tight; ligule short, truncate. *Panicle* 2–6 in., oblong or pyramidal; rachis and branches spreading, perfectly smooth, flexuous. *Spikes* $\frac{1}{5}$–$\frac{1}{3}$ in., pale yellow violet or red-brown, joints and pedicels slender often ciliate on one margin only. *Spikelets* small, callus stellately bearded; gl. I narrowly truncate, 4–6-nerved, scaberulous in all the specimens I have examined; margins narrowly inflexed; II lanceolate, acuminate or mucronate, scaberulous, 1–3-nerved; III short, obtuse, eciliate, nerveless; IV awn $\frac{1}{3}$–$\frac{2}{3}$ in. *Pedicelled spikelets* male, callus naked; gl. I oblong, 7-nerved, margins hardly inflexed; II oblong, obtuse, 3–5-nerved; III oblong, hyaline; IV narrow, awnless.—Spikes often reduced to 3 spikelets, a sessile and 2 pedicelled males.—I have not cited Hackel's synonymy and authorities for the non-Indian forms with more spikelets in each spike. It is very difficult to distinguish *A. micranthus* from small forms of *A. assimilis*. I have seen no specimens from Lisboa.

Var. *villosulus*, Hack. l. c. 490; usually much stouter, sheaths bearded at the nodes and leaves hispidly hairy, gl. I of sessile spikelets often hispidulous. A. villosulus, *Steud. Syn. Gram.* 397; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 69 —(villosus). Chrysopogon villosulus, *Nees ex Duthie Grass. N.W. Ind.* 23 (*excl. some Syns.*). C. montanus, *Duthie Fodd. Grass. N. Ind.* 40. Rhaphis villosula, *Nees ex Steud. l. c.*—Kumaon, *Royle*, &c. Rajputana, Mt. Aboo, *Duthie*. Behar, on Parusnath, *J. D. H.*, &c. Khasia Hills, *Griffith*.

30. **A. assimilis**, *Steud. in Zoll. Syst. Verz.* 58; *Syn. Gram.* 397; suffruticose, fastigiately branched from a decumbent base, leafy, leaves linear-lanceolate much narrowed to the base, lower sheaths open, branches of pyramidal panicle capillary at length widely spreading, joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I oblong or linear-oblong narrowly truncate glabrous or silkily villous below the middle 2–5-nerved between the shortly pectinately ciliate keels. *Miq. Fl. Ind. Bat.* iii. 489. A. montanus, *Benth. Fl. Hongk.* 423 (*excl. Syn.*); *Hack. Monogr. Androp.* 491 (*excl. Syn.*); *Lisboa* in *Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 203. A. capillaceus, *Wall. mss.* A. glaucopsis & subrepens, *Steud. l. c.* Chrysopogon pictus, *Hance in Ann. Sc. Nat. Ser.* 5, v. (1866) 252. C. glaucopsis, *Duthie Grass. N.W. Ind.* 22. Rhaphis repens, *Nees ex Steud. l. c.*—Chrysopogon, *Wall. Cat.* n. 8781, 8786, 8787, 8790.

Temperate Himalaya, from Kashmir to Sikkim, ascending to 5000 ft. The Khasia and Munnepore Hills. Behar; on Parusnath, alt. 4000 ft. Burma, *Wallich*. Rajpootana, *Duthie*. The Deccan and Central India, *King*, &c.—Distrib. Java, China, Japan.

Stems 6 to probably 12 ft. or more; as thick as a goose-quill at the base, hard, shining, sometimes proliferously branched here and there, nodes more or less bearded.

Leaves 2½–6 by $\frac{1}{10}$–$\frac{1}{5}$ in., setaceously acuminate, rather flaccid, glabrous or sparsely hairy on both surfaces, margins subserrulate; sheaths usually bearded at the mouth, upper appressed, lower open and often divaricate; ligule obscure. *Panicle* 2–5 in., triangular, ternately branched; rachis and branches capillary, glabrous, axils more or less bearded. *Spikes* $\frac{1}{4}$–$\frac{1}{3}$ in., joints and pedicels very slender, hairs not longer than the joint. *Spikelets* pale green; gl. I membranous, margins incurved sometimes ciliate with a few very long hairs, flat or concave towards the centre; II acute, margins nearly glabrous, keel flattened ciliolate above; III ovate, obtuse, glabrous; IV awn $\frac{1}{5}$–$\frac{1}{2}$ in., slender, base acute. *Pedicelled spikelets* larger than the sessile, male or neuter; gl. I linear-lanceolate, green or reddish, glabrous or ciliate, 7-nerved, keels ciliolate; II 3–5-nerved; III $\frac{1}{3}$ shorter, oblong, glabrous, nerveless; IV 0.—I have seen no Javanese or other authentic specimens, and hence assume the correctness of Hackel's identification of the Indian plant with it. It is certainly not Roxburgh's *A. montanus*.

31. **A. Hugelii,** *Hack. Monogr. Androp.* 492; stem erect branching from the base, nodes bearded, leaves much narrowed below or petioled linear scaberulous, panicle ovate-oblong, spikes with 2–3 pairs of spikelets, joints shortly ciliate, sessile spikelets $\frac{1}{8}$–$\frac{1}{7}$ in., gl. I oblong or oblong-lanceolate glabrous or villous below the middle 7-nerved tip truncate keels ciliate with long hairs, III minute ovate. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 69.

Western Himalaya? *Huegel.* Rajpootana, on Mt. Aboo, *King*, &c. Central India and the Central Provinces, *Duthie*, &c.

Stem shortly creeping or suffrutescent below, often red, branches 2½–3½ ft. *Leaves* 4–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., acuminate, puberulous beneath, margins scaberulous sometimes ciliate with long hairs; sheath slightly compressed; ligule short, membranous, ciliate. *Panicle* 2–3½ in., shining, branches capillary, axils softly bearded. *Spikes* about $\frac{1}{3}$ in. long, green or purplish; gl. I of sessile spikelets truncate, chartaceous, dorsally polished, margins narrowly incurved, cilia of keels very variable in length; II glabrous, truncate, apiculate, ciliate, keel much thickened; III minute, ovate, glabrous; awn of IV $\frac{1}{2}$–$\frac{2}{3}$ in., base very slender. *Pedicelled spikelets* rather longer than the sessile, lanceolate, green or purple; gl. I 9–11-nerved, keels and back ciliate; II as long, acuminate, 5-nerved, ciliate; III nearly as long, hyaline, oblong, obtuse, glabrous; IV very narrow.—I have seen no typical specimen of this plant which Hackel described from Huegel's specimens, of which the habitat is unknown. The gl. III he describes as absent, an oversight, as it is present in spikelets of the type kindly procured from Vienna for me by Dr. Stapf, and in those collected by King, Duthie and others. Lisboa l. c. 69 describes a var. *fœtidus*, Hack. mss. as common all over the Bombay Presidency, and as having a soft and very pleasant smell. I fail to find any characters in the specimens I have examined, or in the descriptions given, to distinguish it from *A. Huyelii*, except that according to Lisboa the pedicelled spikelet of *fœtidus* has no gl. IV.

32. **A. Schmidii,** *Hook. f.*; stems subsimple or branching below, ascending leafy, nodes bearded, leaves lanceolate acuminate rigid scabrid above base suddenly contracted, sheaths terete smooth, panicle contracted, branches short erect, sessile spikelets broadly oblong obtuse convex 5–7-nerved between the very shortly ciliate and sparsely hairy keels, margins narrowly incurved, II broadly oblong glabrous 3-nerved, III very small ovate, IV a slender awn.

Nilghiri Hills; *Schmid*; Nadavatum, in pastures, alt. 6000 ft., *Lawson*.

Stem 3–4 ft., rather stout, red-brown, smooth. *Leaves* 3–5 by $\frac{1}{6}$–$\frac{1}{3}$ in., finely acuminate, midrib strong, scabrid above with sometimes tubercle-based bristles, scaberulous beneath, margins scaberulous; sheath long, mouth bearded; ligule obscure. *Panicle* 2–4 in., loosely or densely branched; branches and branchlets

smooth. *Spikelets* brown or dull green, callus short, broad, shortly bearded; gl. I rather coriaceous, dorsally shining, smooth or scaberulous; II chartaceous; III broadly ovate, obtuse, nerveless; IV awn ¼ in., very slender. *Pedicelled spikelets* narrower; pedicels shortly ciliate; gl. I 9-nerved, ciliate all over; II narrowly lanceolate, 5-nerved, margins ciliate; III oblong; IV 0.—A stouter grass than the foregoing, with very scabrid leaves and much broader spikelets. Allied to *A. micranthus*, differing conspicuously in the rigid scabrid foliage.

33. **A. filiculmis,** *Hook. f.*; annual, stem elongate filiform flaccid much branched, nodes bearded, leaves 2–4 in. linear-lanceolate finely acuminate flaccid base suddenly narrowed, sheaths lax lower open, panicle long-peduncled lax-fld., rachis and branches capillary, pedicels of upper spikelets ciliate with long hairs, sessile spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. oblong-lanceolate obtuse 5–7-nerved between the keels villous below the middle or all over, keels ciliate with long slender hairs.

The DECCAN; Poonah, in rocky places, *Jacquemont* (n. 310); MAWAR; Dhomsha, *Woodrow* (*Herb. Bomb.* n. 26.)

Stems 2–3 ft., apparently decumbent and interlaced, copiously geniculately branched throughout, quite glabrous, very weak, internodes long pubescent. *Leaves* pale green, $\frac{1}{8}$–$\frac{1}{6}$ in. broad, tip filiform, glabrous or sparsely hairy beneath, margins smooth ciliate towards the very narrow base, costa and nerves very slender; sheaths long, narrow, spreading at the ramifications, glabrous, bearded at the top; ligule broad, membranous, ciliate. *Panicle* 1–2 in., branches few of extreme slenderness. *Spikelets* pale green or white; callus densely shortly villous; gl. I of sessile membranous, nerves faint; II oblong, truncate, mucronate, 3-nerved, glabrous; III very small, ovate, nerveless, eciliate; IV, awn $\frac{1}{2}$–$\frac{3}{4}$ in., column brown twisted. *Pedicelled spikelets* narrower than the sessile; gl. I lanceolate, tip truncate mucronate, 7–9-nerved, ciliate; with long hairs; II as long, ovate-lanceolate, acute, strongly 5–7-nerved; III broadly oblong, hyaline, nerveless; IV 0.—A very delicate grass. The sessile spikelets of Jacquemont's specimens are nearly glabrous, of Woodrow's densely villous, with snow-white hairs.

34. **A. pteropechys,** *Clarke in Journ. Linn. Soc.* xxv. (1889) 88, t. 38; stem very slender, nodes bearded, leaves very narrow, upper sheath spathiform, panicle subpyramidal, branches few capillary villous beneath the few pale brown spikes, spikelets 3–5, joints and pedicels shortly ciliate, sessile spikelets ⅙ in., gl. I oblong obtuse 9-nerved glabrous keels pectinately ciliate for the upper ⅔. *Hack. Monogr. Androp.* 690.

MUNNEPORE; on Jakpho and Kohima, alt. 5500–7500 ft., *Clarke.*

Perennial. *Stem* 2–3 ft. erect from a creeping rootstock, sparingly branched, leafy upwards, nodes thickly bearded. *Leaves* 3–6 by $\frac{1}{8}$–$\frac{1}{6}$ in., finely acuminate, narrowed towards the base, above and margins scaberulous; beneath sparsely hairy; sheaths closed, glabrous; ligule very short, ciliate. *Panicle* 2–3 in.; branches 3–6, ascending, flexuous, glabrous except below the spikes where they are villous with brown hairs. *Spikes* ½-⅔ in.; pedicels of upper spikelets very slender, = ½ the sessile spikelets and joints grooved. *Spikelets* erect, callus hairs = ¼ the spikelet; gl. I dorsally quite glabrous; II ovate-lanceolate, acute, 3-nerved, ciliate; III small, ovate, nerveless; awn ⅓ in., capillary, base acute. *Pedicelled spikelets* narrower than the sessile; gl. I 9–11-nerved; II 3-nerved; III oblong, obtuse, glabrous, nerveless.

Subgen. VI. SORGHUM, *Hack.* *Spikes* panicled, tips of branchlets of panicle not bearded, joints 1 or few and pedicels filiform not or obscurely grooved ventrally, tips truncate. *Spikelets* few, often large, more or less dorsally compressed, broadly oblong ovoid or lanceolate; callus short; gl. I of sessile spikelets coriaceous, often shining, margins narrowly inflexed

above, involute below; II awnless; III hyaline, 2-nerved; IV entire or 2-fid and awned in the cleft, rarely awnless. *Lodicules* (in the Indian species) ciliate.

35. **A. halepensis,** *Brot. Fl. Lusit.* i. 89; perennial, tall, stout or slender, panicle decompound, rachis of spike fragile, joints bearing a circular scar with entire margins, pedicelled spikelets usually male about as long but narrower than the sessile, pedicel = ½ the sessile spikelet. *Sibth. Fl. Græc.* i. t. 68; *Kunth Enum. Pl.* i. 502, *Suppl.* 412, t. 40, f. 1; *Steud. Syn. Gram.* 394; *Thw. Enum. Pl. Zeyl.* 366. A. arundinaceus, *Scop. Fl. Carn. Ed.* ii. 274. A. avenaceus, *H. B. & K. Nov. Gen. & Sp.* i. 189. A. controversus & dubitatus, *Steud. Syn. Gram.* 391, 394. A. laxus, *Roxb. Fl. Ind.* i. 271 (*non Willd.*). A. miliaceus, *Roxb. l. c.* 272; *Hack. Monogr. Androp.* 541. A. miliformis, *Schult. Mant.* ii. 448. A. Sorghum, subsp. halepensis, *Hack. l. c.* 501. Sorghum capense, *Herb. Heyne ex Wall. Cat.* n. 8778 C. S. dubium, *C. Koch in Linnæa,* xxi. (1848) 443. S. giganteum, *Edgew. in Journ. As. Soc. Beng.* (1852) 181. S. halepense, *Pers. Syn.* 101; *Reichb. Ic. Fl. Germ.* t. 54; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 54, t. 91; *Nees Fl. Afr. Austr.* 88; *Griseb. Fl. Brit. W. Ind.* 560; *Benth. Fl. Austral.* vii. 540; *Wall. Cat.* n. 8778; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab. Pl.* 175; *Duthie Grass. N.W. Ind.* 23, *Fodd. Grass. N. Ind.* 40, t. 27. S. saccharatum, *Hohen. Pl. Nilghiri,* n. 1284 (*non Pers.*). S. Schreberi, *Tenore Fl. Neap. Syll. App.* iv. 4. Blumenbachia halepensis, *Koel. Descr. Gram.* 29. Trachypogon avenaceus, *Nees Agrost. Bras.* 354. Holcus halepensis, *Linn. Sp. Pl.* 1047; *Host Gram. Austr.* i. t. 1; *Schreb. Beschr. Græs.* i. t. 18; *Jacq. Eclog. Gram.* t. 48. H. decolorans, *Willd. Sp. Pl.* iv. 931. H. Catamucha, *Ham. ex Wall. Cat.* n. 8778 F.

Throughout India, Burma and Ceylon in open places.—Distrib. Most warm countries.

Roots creeping, stoloniferous. *Stem* 3–15 ft., erect, leafy, simple or branched, nodes pubescent. *Leaves* 8–18 in., or more, up to 3 in. broad, narrowed to the rounded base, tip filiferous, glabrous except towards the often villous base, flat or waved, midrib broad, margins scabridly serrulate; sheath terete; ligule rounded. *Panicle* 6 in. 2 ft., very variable in form and amount of ramification, typically pyramidal with long suberect or spreading or drooping whorled branches, axils often bearded. *Spikes* of 1–3 rarely 5–7 pairs of spikelets, sometimes reduced to a triplet of a sessile fertile and 2 pedicelled male rarely neuter spikelets, joints of rachis and pedicels angular or compressed, glabrous or shortly ciliate. *Sessile spikelets* ⅛ to nearly ¼ in., usually lanceolate, green or purplish, callus sparsely bearded; gl. I with involute sides embracing the others, more or less silkily hairy, rarely glabrous, 5–11-nerved above, there keeled and ciliate tip depressed or not hyaline; II subcoriaceous, chartaceous and keeled above, margins ciliolate; III shorter, elliptic-oblong, hyaline 2-nerved; IV smaller, ovate, obtuse, entire or 2-fid, awned or not, awn ⅙–¼ in. or shorter; palea linear-oblong, obtuse, ciliate. *Pedicelled spikelets* linear-lanceolate, gl. I glabrous, 5–9-nerved, margins inflexed, keels subpectinately ciliate; II lanceolate, 3–5-nerved; III and IV, if present, hyaline.—I have restricted the synonymy of this grass chiefly to Indian names, and those under which good figures are given. It is no doubt the wild form of the following (*A. Sorghum*) and its grain has long been used by natives of India. But whether the *Sorghum* form originated from cultivation of the wild in India, or in Africa, where both are very common, can be only a matter of conjecture. Both seem to be now cultivated in India according to Watt (Dict. of Economic Products of India) and others, and transition forms are frequent. Hackel, who treats *A. halepensis* as a subspecies of *A. Sorghum,* subdivides it under 5 varieties and 6 subvarieties, founded on characters too variable for use. Dr. Stapf, who has studied the African species as well as the Indian, proposes 2 varieties, or

rather prevalent forms, between which transitions occur, both vary in habit and in having awned mucronate or awnless spikelets; they are a. *genuinus*, of which *miliaceus*, Roxb., may be regarded as the type with sessile spikelets $\frac{1}{7}$–$\frac{1}{5}$ in. long, it is *Wall. Cat.* n. 8778 A. B. C. And b. *effusus*, with sessile spikelets $\frac{1}{5}$ nearly $\frac{1}{4}$ in., it includes *A. laxus*, Roxb., *A. halepensis*, Wight Cat. n. 1672, and *Wall. Cat.* n. 8778 D. E. F. H.

36. A. Sorghum, *Brot. Fl. Lusit.* i. 88; annual, tall, usually very robust, panicle decompound usually thyrsiform with crowded whorls of erect branches and branchlets and spikes rarely subeffuse, rachis of spike tenacious, joints when forcibly separated leaving a ragged scar at the tip, pedicelled spikelets usually neuter, pedicels short. *Roxb. Fl. Ind.* i. 273; *Kunth Enum. Pl.* i. 581; *Steud. Syn. Gram.* 393. A. Sorghum, *subsp.* sativus, *Hack. Monogr. Androp.* 505. Holcus Sorghum, *Linn. Sp. Pl.* 1047; *Gærtn. Fruct.* ii. 2, t. 80; *Lamk. Encycl.* t. 838; *Grah. Cat. Bomb. Pl.* 238; *Dalz. & Gibs. Bomb. Fl. Suppl.* 99.

Cultivated throughout the warmer parts of Europe, Asia and Africa.—Introduced into America, Australia, &c.

Under *A. halepense* I have alluded to *A. Sorghum* as the cultivated form of that plant. Of the early history of its culture nothing is recorded, it having no Sanskrit name, and there is no evidence of its being known to the ancients of Europe or the East. Variable as it is, its forms appear to be much less fixed than those of wheat and barley, which gives rise to the suspicion that they are of comparatively recent origin. Many authors have endeavoured to limit by botanical characters some or all of its known varieties, and more have applied specific names to forms they could not, or did not try to identify with known ones. The result is a redundancy of names, and an inextricable synonymy. Watt's "Dict. of Economic Products of India" has treated in great detail the culture of many varieties, but under names that have little or no significance. Hackel has essayed to clean this Augean stable, and has devoted 15 pages of his Monograph to the forms of *A. Sorghum*, of which he describes 37 varieties and 12 subvarieties. His earnest and meritorious attempt has the great advantage of approximately harmonising most of the Indian citations and synonyms, and I therefore give a précis of it. It, however omits characters of the glumes which Dr. Stapf, in working up the African forms, has studied, and which characters appear to be of far more importance than those relied on by Hackel. Unfortunately it is not possible to combine the two classifications, for the obvious reason that Stapf's characters have been neglected in the descriptions of previous investigators, and it remains for the Indian botanists in this case, as in that of *Pennisetum typhoideum*, and indeed many other cultivated plants, to remove this reproach to Indian botany. Hackel's Indian varieties are as follow:—

Var. *Roxburghii*, Hack. l. c. 510; panicle lax ovate-oblong, rachis elongate, branches drooping, sessile spikelets ovate awnless, gl. I keeled in the upper third, grain white.—A. saccharatus, *Roxb. Fl. Ind.* i. 271; *Dalz. & Gibs. Fl. Suppl.* 99 (*non Kunth*).

Var. *Wightii*, Hack. l. c. 511 characters of var. *Roxburghii*, but panicle more dense, branches scabrid, spikelets broadly elliptic, gl. I hairy in the upper half. *Herb. Wight* n. 185.

Var. *vulgaris*, Hack. l. c. 515; panicle dense, branches erect or erecto-patent, sessile spikelets $\frac{1}{6}$ in. obovoid or subglobose obtuse awned; A. Sorghum, *Roxb. l. c.* 269; Sorghum vulgare, *Pers. Syn.* i. 101; *Reichb. Ic. Fl. Germ.* t. 80; *Duthie Grass. N.W. Ind.* 23, *Field & Gard. Crops.* 25, t. 6, *Fodd. Grass. N. Ind.* 41; Holcus Sorghum, *Linn.*

Var. *cernuus*, Koern. Handb. Getreit. i. 314; very robust, panicle drooping ovoid obtuse compact, rachis and appressed branches short suberect subvillous, sessile spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. broadly obovoid or rhomboid obtuse awned whitish densely silkily villous or glabrescent dorsally, grain globose white with a black

hilum. A. cernuus, *Kunth l. c.* (*excl. Syn. Roxb.*). A. compactus, *Brot. l. c.* 88; Sorghum cernuum, *Host Gram. Austr.* iv. t. 3; *Reichb. Ic. Fl. Germ.* t. 80. Holcus cernuus, *Ard. in Sag. Sc. e Lett. Acad. Padua*, i. 12, t. 3, f. 1, 2.—*S. saccharatum*, Strachey & Winterbottom, from Kumaon, alt. 5000 ft. is a proliferous state.

Var. *glabrosus*, Hack. l. c. 517; panicle ovoid compact at length straw-colrd., sessile spikelet $\frac{1}{5}$ in. suborbicular not awned villous.—Serampore, *Voigt* (in Herb. Copenhagen.)

Var. *miliiformis*; (*not* A. miliformis, *Schult.*); panicle dense, sessile spikelets $\frac{1}{7}$ in. suborbicular at length straw-colrd. strigosely hairy, gl. IV with an exserted mucro, grain dark brown or violet brown.

Var. bicolor, *Hack. l. c.* 519; panicle very dense, sessile spikelets $\frac{1}{6}$ in. obtusely hexagonal awnless at length black, gl. I coriaceous below the middle, then deeply rugged, upper part striate hairy, grain almost twice as long as the gl. white. ?A. bicolor, *Kunth l. c.* 501, *non Roxb.*; ?A. cernuus, *Roxb. Fl. Ind.* i. 270. ?Sorghum bicolor, *Willd. Enum. Hort. Berol.* 1036. ?Holcus bicolor, *Linn. Mant.* ii. 301.—Deccan Peninsula, *Herb. Wight* n. 185 B.

Dr. Stapf's arrangement of the Indian forms (including many of the African) is the following. I do not cite the habitats and synonyms of the varieties given by Hackel, for to do so might include plants to which the characters adopted by Dr. Stapf may not apply :—

* Glume I of sessile spikelets not depressed below the tip.

Var. *hians*, Stapf; gls. I and II divaricate exposing the white grain, tip of gl. I coriaceous.—S. vulgare, Pers. β. *Wight Cat.* n. 1670 (*not in Hackel.*)

Var. *Roxburghii*; Hack. l. c. 510; tip of gl. I hyaline, nerves obscure, sessile spikelets $\frac{1}{5}$ in. ovate acuminate awnless.—*Wall. Cat.* n. 8777 D. (the right hand specimen) F. H.

Var. *saccharatus*, Koern.; spikelets $\frac{1}{5}$ in. ellipsoid acute or apiculate awned, tip of gl. I hyaline, nerves obscure.

Var. *Thomsoni*, Stapf; spikelets $\frac{1}{4}$ in. ovate, gl. I strongly nerved below the tip.—A single specimen from Upper Gangetic Plain, *Thomson.*

** Glume I of sessile spikelets depressed below the tip, nerves distinct up to or near to the base.

Var. *nervosus*, Stapf; Hack. l. c. 513.—S. India, Herb. *Rottler.*

*** Glume I of sessile spikelets depressed below the tip, nerves distinct below the tip only.

Var. *obovatus*, Hack. l. c. 514; panicle very loose, gl. I and II at length more or less black and shining.—*Wall. Cat.* n. 8777 E. J. L.

Var. *vulgaris*, Hack. l. c. 515; panicle erect contracted, gl. I of sessile spikelets $\frac{1}{5}$ in. acute depressed and triangular for the upper $\frac{1}{3}$.—*Wall. Cat.* n. 8777 A; C is a form with smaller spikelets, only $\frac{1}{6}$ in. long.

Var. *miliiformis*, Hack. l. c. 518 (not A. miliformis, *Schult.*); panicle erect contracted, gl. I of sessile spikelets $\frac{1}{8}$–$\frac{1}{7}$ in. truncate depressed part very narrow reddish.

Var. *cernuus*, Koern.; Hack. l. c. 576; very robust, panicle forming a dense ovoid or oblong cernuous or decurved head, sessile spikelets small almost orbicular usually tomentose.—*Wall. Cat.* n. 8777 B. G. K.

37. **A. Stapfii**, *Hook. f.*; annual, stems short branching from the leafy base, leaves 2–3 in. linear-oblong acute base cordate, panicle erect slender loose, branches few short erect, spikelets few $\frac{1}{5}$–$\frac{1}{4}$ in. ovoid erect acute silkily villous with white hairs, gl. I ovate 9–11-nerved tip 2-toothed, and II very coriaceous.

Tinnevelly, at Palamcottah, *Wight.*

Stems many, 12–16 in., spreading from the fibrous roots; geniculately ascending,

quite smooth. *Leaves* ¼–⅓ in. broad, flaccid, flat, margins smooth, nerves 3–5 on each side of the slender midrib; sheaths of lower short open, of the upper long rather loose, quite glabrous; ligule very short, membranous, glabrous. *Panicle* 2–4 in.; rachis and branches stiff, angular, subscaberulous, rather stout, green. *Spikes* of 1–3 pairs of rather distant white spikelets; joints = ⅔ the sessile spikelet, stout, shortly villous truncate, pedicels = ½ the spikelet, more slender. *Sessile spikelet* terete; callus very short, stellately bearded with white hairs; gl. I and II very coriaceous both with strongly incurved sides, nerves very slender with many cross-nervules; III oblong, truncate, hyaline, 2-nerved, ciliate; IV short subrhomboidal, cleft to the middle into triangular acute ciliate lobes; awn in the cleft ¾ in., smooth, slender; palea linear-oblong, ciliate, nerveless. *Anthers* long. *Pedicelled spikelets* very narrow, imperfect, neuter, gl. I lanceolate, 9-nerved, bicuspidate; II shorter, 5-nerved.—A closely allied species, with similarly densely silky white spikelets, has been collected by Lunt in Southern Arabia, where it is stated to be cultivated. It is a stout plant with much larger leaves and the habit of the ordinary *Sorghum*. The spikelets are shorter and broader than in *A. Stapfii*, and are collected in a dense oblong panicle.

38. **A. serratus**, *Thunb. Fl. Jap.* 41; tall, erect, leaves narrowly linear, base narrow, lower branches of subsimple narrow elongate panicles whorled, spikes solitary 2–8-jointed, joints pedicels and callus shortly villous with rufous or purple hairs, sessile spikelets ⅐–⅙ in. ovoid ellipsoid or lanceolate, gl. I rufously hirsute towards the pale tip and sides, IV shortly awned or awnless. *Hack. Monogr. Androp.* 520; *Grah. Cat. Bomb. Pl.* 238.

Throughout INDIA, on the hills and plains from the Panjab to Burma, and southward to CEYLON and the NICOBAR ISLDS.—DISTRIB. Asia and Austral trop.

Perennial. *Stem* 3–4 ft., subsimple, nodes bearded. *Leaves* 4–20 by ⅛–¾ in., setaceously acuminate, glabrous or sparsely hairy on both surfaces, hairs often tubercle-based, midrib broad; sheaths terete below keeled upward, more or less hairy; mouth silkily villous; ligule very short, truncate. *Panicle* 4–12 in., oblong, rachis glabrous; branches capillary, about equalling the spikes, glabrous or scaberulous, whorls distant. *Spikes* ½–1½ in., red-brown; joints and pedicels = ½ the sessile spikelets, margins shortly villous. *Sessile spikelets*, callus acute; gl. I coriaceous, dark brown or nearly black, glabrous and polished on the middle dorsally, tips pale; II rather longer, lanceolate, acute, 1-nerved, hairy upwards; III shorter, lanceolate, acute; IV small, oblong, entire or 2-lobed, awned or not. *Lodicules* ciliate. *Pedicelled spikelets* narrower than the sessile, paler, hairy; gl. I 7-nerved; II 3-nerved; III and IV linear, ciliate.—Roxburgh does not seem to have known this grass.

Var. *genuinus*, Hack.; gl. IV of sessile spikelet 2-lobed, awned in the cleft. A. serratus, *Thunb. l. c.* (*non Retz*). A. laxus, *Willd. Sp. Pl.* iv. 907 (*non Roxb.*); *Steud. Syn. Gram.* 391. A. tropicus, *Spreng. Syst. Veg.* i. 287; *Kunth Enum. Pl.* i. 503 (*non Kunth*); *Thw. Enum. Pl. Zeyl.* 366; *Benth. Fl. Hongk.* 423. A. dichroanthus, *Steud. in Zoll. Syst. Verz.* 58. Sorghum fulvum, *Beauv. ex Roem. & Sch. Syst.* ii. 840; *Benth. Fl. Austral.* vii. 541; *Trim. Cat. Ceyl. Pl.* 108. S. Junghuhnii, *Miq. Fl. Ind. Bat.* iii. 783. Holcus fulvus, *Br. Prodr.* 199.

Var. *nitidus*, Hack.; gl. IV. of sessile spikelet entire not awned. A. consimilis and pedicellatus, *Steud. Syn. Gram.* 394. A. fuscus, *Presl Rel Hænk.* i. 342; *Kunth l. c.* 502. A. nigrum, *Herb. Ham. in Wall. Cat.* n. 8777 E. A. nitidus, *Kunth Revis. Gram.* i. 166, *Enum. l. c.* 510. Sorghum halepense, *Wall. Cat.* 8878 E. G.; *Wight Cat.* n. 2350. S. muticum, *Nees in Herb. Wight; Aitchis. Cat. Panjab. Pl.* 175; *Duthie Grass. N.W. Ind.* 23. Chrysopogon fuscus, *Trin. ex Steud. Nom. Ed.* II. i. 360. Holcus quinqueflorus, *Herb. Ham. ex Wall. Cat.* n. 8778 G.—Andropogon, *Wall. Cat.* n. 8879.

39. **A. purpureo-sericeus,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 469; annual, robust, upper nodes villous, branches of subsimple panicle

few or many in a whorl flexuous, spikes subsolitary, joints pedicels and callus villous with long white or red brown hairs, sessile spikelets ⅓ in. oblong-ovate, gl. I 5–7-nerved villous all over tip acute, II 2-fid, awn long stout. *Hack. Monogr. Androp.* 524. Sorghum purpureo-sericeum, *Asch. & Schweinf. Beitr. Fl. Æthiop.* 310. S. Ritchiei, *Munro mss.*

The DECCAN; Belgaum, *Ritchie.* N. Canara, *Woodrow.* CENTRAL PROVINCES, *Duthie.*—DISTRIB. Abyssinia.

Stem 3–4 ft., erect; stout or slender. *Leaves* 8–10 by ¼–⅓ in., linear, finely acuminate, sparsely hairy, margins hardly scabrid; sheath, ribbed, glabrous or margin fimbriate, mouth villously silky; ligule very short, ciliate. *Panicle* 4–10 in., erect; rachis glabrous; branches ⅓–1 in., capillary. *Spikes* 1–1½ in., rarely of 3 joints, sometimes of one sessile and 2 pedicelled spikelets, joints about ½ the sessile spikelet. *Spikelets* erect or spreading or pendulous, dorsally flattened; gl. I coriaceous, margins involute from base to apex, keels rounded, villi red-brown or snow-white; II as long as I, acuminate or aristulate, dorsally rounded, coriaceous; III hyaline, epaleate, 2-nerved, ciliate; IV very fragile, 3-nerved, below the middle ciliate with long hairs; awn 1–1¼ in., column stout red-brown twisted glabrous; palea minute, ciliate. *Pedicelled spikelets* usually shorter paler and narrower than the sessile; gl. I thinner, 7-nerved, shortly silky; II and III as in the sessile; IV lanceolate, acuminate, 1-nerved, ciliate, male.—The Indian differs from the African plant in having rather smaller spikelets, in gls. I and II of the sessile not or less scariose at the tip. The pubescence of the spikelet is more copious and pure white in a Deccan specimen from Woodrow, and in a Panjab ? one from Stewart. Hackel has named Duthie's specimens *A. purpureo-sericeus* var. *variegatus*.

Subgen. VI. VETIVERIA, *Hack.* *Spikes* panicled, branches of panicle many, whorled; joints 3 or more and pedicels linear filiform dorsally convex not channelled, tip truncate. *Sessile spikelets* laterally or dorsally compressed, awned or not; gl. I coriaceous, narrow, margins inflexed or involute, keels muricate; II awned or not; III hyaline; IV entire or 2-fid, awned. *Lodicules* glabrous.

But distinguished from *Chrysopogon* by the absence of a beard of rigid hairs on the tip of the branchlets, seen after the fall of the spike. *A. venustus* is removed to *Amphilophis*.

40. **A. squarrosus,** *Linn. f. Suppl.* 433; stem stout, leaves long rigid, sheaths strongly compressed, panicle narrow, branches simple strict, spikes many-jointed joints and pedicels glabrous, sessile spikelets linear-oblong glabrous, gl. I coriaceous acute dorsally flat, margins broadly inflexed muricate, IV linear-oblong mucronate or shortly awned. *Vahl Symb.* iii. 9; *Hack. Monogr. Androp.* 542; *Lisboa in Bomb. Journ. Nat. Hist.* vi. (1891) 67. A. muricatus, *Retz. Obs.* iii. 43, v. 21; *Kunth Enum. Pl.* i. 505, *Suppl.* 416; *Roxb. Fl. Ind.* i. 265; *Wall. Cat.* n. 8759; *Grah. Cat. Bomb. Pl.* 238; *Griff. Notul.* iv. 84, *Ic. Pl. Asiat.* t. 139, f. 57, t. 155, f. 1; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 108; *Dalz. & Gibs. Bomb. Fl.* 302; *Duthie Grass. N.W. Ind.* 90, *Fodd. Grass. N. Ind.* 36, t. 24. A. festucoides, *Presl Rel. Hænk.* i. 340. A. nigritanus, *Benth. in Hook. Niger Fl.* 573; *Steud. l. c.* 394. Anatherum muricatum, *Beauv. Agrostog.* 150, t. 22, f. 10; *Spreng. Pugill.* ii. 15. Vetiveria odorata, *Virey in Journ. Pharmac. Soc.* I. xiii. 499. V. arundinacea & muricata, *Griseb. Fl. Brit. W. Ind.* 559, 560. Mandelorna insignis, *Steud. l. c.* 359. Agrostis verticillata, *Lam. Dict.* 59, *Ill. Gen.* n. 162, *Suppl.* i. 255. Phalaris zizanioides, *Linn. Mant.* ii. 183. Holcus ?Viranae, *Herb. Ham. ex Wall. l. c.*—Virana, *Jones in As. Research.* iv. 306.

Throughout the Plains and Lower Hills of INDIA, BURMA and CEYLON, ascending to 4000 ft.—DISTRIB. Java, Afr. trop.

Stems 2–5 ft., in large, dense tufts with stout spongy aromatic roots, sparingly branched, as thick below as a goose-quill. *Leaves* 1–2 ft., subbifarious, narrow acute, erect, keeled, glabrous, margins scabrid; sheaths equitant, glabrous; ligule obscure. *Panicle* 4–12 in., conical, erect, rachis stout and erecto-patent filiform flexuous branches glabrous or scaberulous. *Spikes* slender, joints and pedicels about = the sessile spikelets. *Sessile spikelets* grey green yellow or purplish, $\frac{1}{8}$–$\frac{1}{4}$ in., slightly curved, glabrous, callus obscurely bearded; gl. I coriaceous, acute, 2–4-nerved; II coriaceous, 1-nerved, margins hyaline, keel muricate; III lanceolate, acuminate, 2-nerved, margins inflexed ciliolate; IV = III ciliate; palea very small, obtuse, glabrous. *Pedicelled spikelets* like the sessile but gl. I smooth, IV awnless. —Khus-khus grass.

41. **A. Lawsoni,** *Hook. f.*; stem erect from a stout rootstock, leaves narrowly linear curved acute or obtuse tips serrulate, sheaths compressed, panicle narrow elongate branches erect, spikes pale, joints 6–8 and pedicels slender obliquely truncate, gl. I linear rigid keels muricate dorsally flat scaberulous margins inflexed, II awned keel pectinately ciliate above the middle, IV 2-toothed awned.

MYSORE; at Bandypore, alt. 3000 ft., in moist ground, *Lawson*.

Rootstock horizontal; stems simple, slender, internodes very long. *Leaves* chiefly subradical, 2–5 by $\frac{1}{5}$ in., exactly linear, rigid, base not contracted, margins ciliate, nerves 4–8 strong; sheath of lower very short, of cauline very long, striate; ligule a ridge of hairs. *Panicle* 6–7 in., branches or peduncles of spikes opposite and fascicled, and branchlets slender puberulous with a white scurf. *Spikes* $\frac{1}{4}$–$\frac{1}{2}$ in., pale reddish, erect; joints very obliquely truncate, tips obscurely ciliate, and pedicels nearly = spikelet, slender, compressed. *Sessile spikelets* $\frac{1}{6}$ in., linear-lanceolate, callus bearded with silky hairs; gl. I coriaceous, tip obtuse, bristly; II cymbiform, tip 2-fid, awn longer than the gl., base ciliate; III oblong, ciliate, nerveless; IV arched, linear, obtusely 2-toothed, awn very slender; palea oblong, ciliate, nerveless. *Anthers* long. *Pedicelled spikelets* male, longer and narrower than the sessile, callus naked, gl. I 3-nerved, awned, keels pectinately ciliate; II acuminate, awned; III and IV oblong, obtuse, ciliate.—The tips of the branchlets bearing the spikes have a few short unequal bristles, showing an approach to those of *Chrysopogon*.

Subgen. VII. CHRYSOPOGON, *Hack.* *Spikes* of 3 spikelets, solitary or subsolitary (1–4 in *C. Gryllus*) on the capillary whorled branches of an erect or inclined panicle; branches with obconic obliquely truncate tips crowned with a ring or beard of stiff hairs. *Spikelets* 3-nate, a sessile bisexual, and 2 pedicelled males or neuters. *Sessile spikelets* narrow, laterally compressed; gl. I narrow, linear, rigid, erect, 4-nerved, usually laterally compressed; II broader, laterally compressed, obtusely keeled, 3-nerved, tip 2-lobed awned or not; III hyaline, 2-nerved; IV the narrow hyaline 1–3-nerved base of a long awn. *Pedicelled spikelets* dorsally compressed; gls. I and II awned or not.—*Ligule* of minute hairs in all.

The only subgenus with the tips of the branches of the panicle bearded, as best seen after the fall of the spike. The genus has a better claim to be retained than most of *Andropogoneæ*. The species are, with the exception of the first two, very difficult of definition, and must be regarded as merely provisionally established.

* Pedicels of the upper spikelets half as long as the sessile spikelet or longer.

† Pedicels of the upper spikelets glabrous or nearly so.

42. **A. Gryllus**, *Linn. Cent. Pl.* ii. 33; stem simple, panicle large,

branches long capillary spreading simple or branched and bearing 2–4 spikes, sessile spikelets $\frac{1}{5}$–$\frac{1}{3}$ in., gl. I 2-toothed dorsally rounded with 2 muricate or mamillate keels or channels, II mucronate or aristulate keel and sides bristly above the middle. *Kunth Enum. Pl.* i. 504; *Hack. Monogr. Androp.* 550; *Steud. Syn. Gram.* 395; *Host Gram. Austr.* ii. 1, t. 1; *Sibth. Fl. Græc.* i. t. 67; *Duthie Grass. N.W. Ind.* 22, *Fodd. Grass. N. Ind.* 40. A. echinulatus, glabratus & Royleanus, *Steud. l.c.* 395, 397. A. pallidus, *Kunth Revis. Gram.* i. 165. A. paniculatus, *Lam. Fl. Fr. Ed.* 2, iii. 633; *Ill. Gen.* 840, f. 1. Chrysopogon Gryllus, *Trin. Fund. Agrost.* 188; *Nees Gen. Fl. Germ. Monocot.* i. t. 93; *Benth. Fl. Austral.* vii. 537; *Aitchis. Cat. Panjab. Pl.* 176. C. glabratus, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 318. Rhaphis Gryllus, *Desv. Opusc.* 69. R. Royleana, *Nees ex Steud. l. c.* 397. R. echinulata, *Nees in Royle Illustr. Bot. Himal.* 417. Pollinia Gryllus, *Spreng. Pugill.* ii. 10; *Reichb. Ic. Fl. Germ.* t. 54. P. pallida, *Roem. & Sch. Syst.* ii. 829. Apluda Gryllus, *Presl Cyp. & Gram. Sic.* 55. Holcus Gryllus & pallidus, *Br. Prodr.* 199.—Chrysopogon, *Wall. Cat.* n. 8792 B. C. D.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4–9000 ft. KHASIA HILLS, alt. 4–5000 ft.—DISTRIB. Eastwards to S. Europe and N. Africa, Australia.

Stems forming dense hard tufts, erect, 6 in. to 5 ft. high, as thick as a goose-quill below; nodes smooth. *Leaves* 6–18 by $\frac{1}{6}$–$\frac{1}{3}$ in., linear, acute, glabrous or hirsute, margins serrulate; sheath keeled above, glabrous or pubescent. *Panicle* 3–8 in.; rachis angular, scabrid, axils bearded; branches 2–4 in., usually very many in a whorl, tips obliquely truncate densely bearded. *Sessile spikelets*; callus straight, acute; gl. I coriaceous, shining, smooth or scaberulous, margins broadly involute; II chartaceous, lanceolate, hyaline, margins ciliate, awn = the spikelet or shorter; III linear-oblong, obtuse, nerveless; IV linear, minutely 2-toothed, awn minute or $\frac{1}{2}$–$1\frac{1}{2}$ in.; palea small, oblong, glabrous. *Pedicelled spikelets* rather longer than the sessile, terete, lanceolate, acuminate; pedicels glabrous or ciliolate; gl. I acuminate or aristulate, 5–9-nerved, keels ciliate above; II lanceolate, acuminate, ciliate; III and IV narrower, ciliate; awn of IV = $\frac{1}{2}$ the glume.—Hackel has 5 subspecies, of which 3 are Indian. 1. *genuinus*; callus about $\frac{1}{8}$ in. hairs rusty-brown, awn of gl. IV 1–$1\frac{1}{2}$ in. stout. 2. *echinulatus*, callus hairs pale yellow, awn $\frac{1}{2}$–$\frac{3}{4}$ in. slender. 3. *glabratus*, awn of gl. II minute.

43. **A. aciculatus,** *Retz. Obs.* v. 22; stem creeping and branching below, leaves short, sheaths terete, panicle very narrow, branches strict erect, spikes solitary, sessile spikelets very narrow, callus very long acicular, gl. I linear acute or minutely 2-cuspidate convex margins broadly inflexed smooth below keels scabrid aculeolate above, II acuminate aristulate, keel ciliate above. *Roxb. Fl. Ind.* i. 262; *Grah. Cat. Bomb. Pl.* 238; *Hack. Monogr. Androp.* 562. A. acicularis, *Willd. Sp. Pl.* iv. 906; *Kunth Enum. Pl.* i. 505, *Suppl.* 417. A. javanicus, *Steud. Syn. Gram.* 396. A. subulatus, *Presl Rel. Hænk.* i. 341. Chrysopogon aciculatus, *Trin. Fund. Agrost.* 188; *Wall. Cat.* n. 8780; *Wight Cat.* n. 1674; *Thw. Enum. Pl. Zeyl.* 366; *Trim. Cat. Ceyl. Pl.* 108; *Duthie Grass. N.W. Ind.* 22 (acicularis), *Fodd. Grass. N. Ind.* 39; *Benth. Fl. Hongk.* 424, *Fl. Austral.* vii. 538. C. subulatus, *Trin. ex Steud. Nomencl. Ed.* II. ii. 360; *Miq. Fl. Ind. Bat.* iii. 491. C. trivialis, *Arn. & Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 171. Rhaphis acicularis, *Desv. Opusc.* 69. R. javanica, *Nees ex Steud. Syn. Gram.* 396. R. trivalvis, *Lour. Fl. Cochinch.* 553; *Trin. Sp. Gram. Ic.* t. 8, 9. Centrophorum chinense, *Trin. Fund. Agrost.* 106, t. 5.—Holcus, *Griff. Notul.* iii. 12, *Ic. Pl. Asiat.* t. 141, f. 1 (aciculatus).—*Rheede Hort. Mal.* xii. t. 43.

Plains and lower hills of INDIA, from Kumaon to Sikkim in the Himalaya, the Khasia Hills and southward to the Nicobar Islds. and CEYLON.—DISTRIB. Trop. Asia, Australia, and Polynesia.

Stem woody leafy and extensively creeping below, then erect, 1–2 ft., slender. *Leaves* densely tufted, 1–5 by $\frac{1}{8}$–$\frac{1}{5}$ in., flat, obtuse or acute, often undulate, glaucous, glabrous, margins spinulose; sheath terete; ligule a very narrow ciliate membrane. *Panicle* 1–3 in., pale or purplish; branches capillary, scaberulous or villous below the spikelets, tips obliquely truncate. *Sessile spikelets* $\frac{1}{6}$ in.; callus nearly as long as the glumes, acicular, shortly bearded; gl. I chartaceous, obscurely 2–3-nerved or nerveless; II lanceolate, acuminate or aristulate, 1-nerved; III linear-oblong, 2-nerved; IV linear, acuminate; awn $\frac{1}{6}$–$\frac{1}{3}$ in., scabrid; palea small, linear, obtuse, glabrous, nerveless. *Pedicelled spikelets* purple, much longer and narrower than the sessile; pedicels slender, scaberulous; gl. I subulate-lanceolate, aristulate, 3-nerved, ciliate; III and IV shorter, ciliate; palea minute, cuspidate.

†† Pedicels of upper spikelets villous with rusty rarely pale hairs.

§ *Glume I of pedicelled spikelets long-awned, II not or very shortly awned.*

44. **A. verticillatus,** *Roxb. Fl. Ind.* i. 263; tall, stout, leafy, leaves long very hairy, panicle broad of many whorls of many long simple smooth spreading arching branches terminated by solitary drooping spikelets, sessile spikelets $\frac{1}{4}$ in., callus rather long glabrous in front, gl. I setulose beneath the tip only strongly compressed above, II glabrous keel ciliate beneath the long awn, awn of IV $1\frac{1}{2}$ in., pedicelled spikelets $\frac{1}{3}$ in. narrowly lanceolate glabrous 5-nerved keels ciliate at the tip only. *Kunth Enum. Pl.* i. 506; *Hack. Monogr. Androp.* 555. Chrysopogon verticillatus, *Trin. ex Steud. Nom. Ed.* II. i. 360.

Mountainous Regions (of the N. Circars probably), *Roxburgh.*

Root woody, perennial. *Stem* 4–6 ft., terete, solid towards the base, smooth, as thick as a small goose-quill. *Leaves* approximate, 18 by $\frac{5}{4}$ in., particularly hairy on the inside towards the base, margins spinulose. *Panicle* conical, lax, 8–10 in.; branches 2–3 in. *Spikes* narrow, pale. *Sessile spikelets* about twice as long as the pedicels; callus $\frac{1}{16}$ in. long; gl. I 4-nerved, tip hyaline, acute; II narrow, tip 2-fid, awn as long as itself; III oblong, obtuse, margins retrosely ciliate; IV the very narrow 3-nerved hyaline base of the awn, tip obscurely 2-lobed. *Pedicelled spikelets* pale, shining, pedicels abruptly truncate rather laxly ciliate on the margins and dorsally; gl. I with the 2 lateral nerves nearer the margin, awn longer than itself; II lanceolate, acuminate, ciliate, 3-nerved; III very narrow, ciliate, 2-nerved; IV linear, 1-nerved, 2-fid.—I have seen only a single very slender leafless specimen of what I take to be Roxburgh's plant, bearing the name in Arnott's handwriting on a ticket with Roxburgh's name in that botanist's writing in the corner. The description of the habit, leaves, &c., is taken from Roxburgh. Hackel, who does the same, describes the spikelets from a specimen also named by Arnott, and sent to him from Nees' Herbarium.

45. **A. asper,** *Heyne in Herb. Rottler* (asperum); leaves broadly linear acute base cordate midrib beneath spinulose, sheaths broad compressed laxly hirsute, panicle narrow of many whorls of short simple smooth erect branches bearing solitary rarely 2 erect spikes, sessile spikelets $\frac{1}{4}$ in., callus long villous all round, gl. I hispid beneath the tip strongly compressed above, II keel and sides more or less hispid above the middle, awn of IV $1\frac{1}{2}$–2 in., pedicelled spikelets $\frac{1}{3}$ in. narrowly lanceolate 7-nerved keels ciliate.—Chrysopogon asper, *Heyne ex Wall. Cat.* n. 8784.

MADRAS; Pulicat Hills, *Heyne.*

Stem 2–3 ft., leafy below, very slender above. *Leaves* distichous, 12–18 by ½–¾ in., exactly linear, coriaceous, flat, smooth, midrib very slender, 11-nerved, margins spinulosely serrulate, and with a few long tubercle-based cilia towards the broad semi-amplexicaul base, midrib beneath serrulate; lower sheaths ½ in. broad, keeled, armed with scattered tubercle-based hairs. *Panicle* 7 in., rachis smooth; branches unequal, those of the lowest whorl the longest, about 1 in., usually with only one spike, tips very shortly bearded. *Sessile spikelets* pale, coriaceous; callus ¼–½ in.; awn of II as long as itself or shorter; III shorter than II, narrow, obtuse, 2-nerved, ciliate; IV the linear hyaline 3-nerved base of the awn. *Pedicelled spikelets* pale, shining, pedicels very shortly rufous-villous on both margins, excised at the tip in a semicircle; gl. I thin, tip 2-toothed, nerves strong subequidistant, or the 3 lateral on each side submarginal, margins narrowly incurved, keels ciliolate from base to tip; II lanceolate, acuminate, 3-nerved, ciliolate; III linear-oblong, 2-nerved, ciliate; IV narrowly lanceolate, 1-nerved.—I have seen only two specimens of this plant, that in Herb. Wallich, and another sent by Heyne to Rottler named *A. asperum* in his own handwriting. Very closely allied to *A. verticillatus*, but differing totally in habit and foliage according to Roxburgh's drawing and description of that plant, and coming from a very different part of India.

46. **A. lancearius,** *Hook. f.*; stem tall leafy, leaves narrowly lanceolate acuminate narrowed towards the base quite glabrous flat smooth midrib beneath quite smooth, sheaths imbricate compressed, panicle narrow of many whorls of short simple smooth erect branches bearing solitary erect spikes, sessile spikelets ¼ in., callus short glabrous in front, gl. I glabrous or minutely ciliate at the strongly compressed tip, II keel and sides above the middle more or less hispid, awn of IV 1¾ in., pedicelled spikelets ⅓ in. narrowly lanceolate 7-nerved keels eciliate except at the tip.

Sikkim Himalaya; at the foot of the hills, Punkabaree, *Kurz.* Chota Nagpore; Ramghur, Ghat, 1750 ft., *Clarke.*

Stem 2–3 ft. or more, leafy upwards. *Leaves* 12–14 by ⅓–½ in., rather thin, narrowed from below the middle to the base, quite smooth on both surfaces, midrib broad white above, nerves many very slender, margins minutely spinulose; sheaths keeled, quite glabrous; ligule a row of very fine short hairs. *Panicle* 6 in., quite like that of *A. asper*, from which this plant differs in the leaves, in the callus glabrous in front, in the much more hairy gl. II of the sessile spikelet, and in the eciliate keels of gl. I of the pedicelled spikelets.—The Chota Nagpore specimen has been named *A. verticillatus* by Hackel in a letter to Mr. Clarke, from which it differs in the form of the panicle and glabrous leaves; its gl. IV of the pedicelled spikelets is 2-fid, but that of the Sikkim plant is lanceolate and aristately acuminate. I have examined a specimen of what may prove to be a form of this plant collected at Gya in Behar (Herb. Hort. Calcutt.) in which gls. II and IV of the pedicelled spikelets are both awned, the awn of the latter (IV) being sometimes as fully developed as that of the sessile spikelet! The specimen is in too imperfect a condition to be described fully: the gl. I of the pedicelled spikelet is quite glabrous with a 2-toothed tip. In all other respects it agrees with *A. lancearius*.

47. **A. Hamiltoni,** *Hook. f.*; tall, stout, leaves very long linear gradually acuminate smooth above scaberulous beneath margins nearly smooth, panicle large ovoid dense of many long smooth erect branches in many closely approximate whorls each bearing 1–3 spikelets, spikes erect, sessile spikelets ¼ in., callus very short villous all round, gl. I minutely hispid at the strongly compressed tip, II keel ciliate close under the long awn, awn of gl. IV 2½ in., pedicelled spikelets ½ in. linear-lanceolate, gl. I 7–9-nerved ciliate close to the tip only. Holcus Carar, *Ham. in Wall. Cat.* n. 8792 A.—Chrysopogon, *Wall. Cat. l. c.*

Behar; Monghir, *Hamilton.*

Stem several feet high, stout, terete, leafy, quite smooth. *Leaves* 1½ ft. or more by ¼–½ in., flat, rather thin, many-nerved, beneath and midrib quite smooth, base rather contracted; sheath terete, smooth, glabrous; ligule a ridge of minute hairs. *Panicle* 6 by 2½ in., peduncle stout as thick as a duck's quill; rachis stout, terete; branches very unequal, longest 2–3 in., each with usually 2–3 spikes. *Sessile spikelets*, callus $\frac{1}{20}$ in.; gl. I 4-nerved, polished; II 2-lobed, awn as long as itself, margins not ciliate; III oblong, obtuse, hyaline, 2-nerved; III the linear hyaline 3-nerved eciliate base of the awn. *Pedicelled spikelets* pale green, pedicels sparsely villous on the margins and back with short rufous hairs, unequal, ⅓ and ¼ shorter than the sessile spikelet; gl. I narrowed into an awn often as long as itself, lateral 3 nerves on each side submarginal; II and III lanceolate, acuminate, retrorsely ciliate, II 3-nerved, III 2-nerved.—The specimen in Herb. Wallich consists of a portion of a stem a foot long, a panicle fully emerged from a leaf-sheath, with suberect branches which will probably spread later on, and several leaves. Another in Hamilton's Herbarium (now at Edinburgh) corresponds precisely. It is nearly related to *asper*, but a very robust tall plant, the branches of the panicle are much more numerous and longer, the leaves glabrous and not spinulosely margined, the spikelets much larger, the callus shorter, and the margins of gl. II of the sessile spikelet eciliate. It may prove to be a form of *A. verticillatus*.

§§ *Glumes I and II of pedicelled spikelets both awned.*

48. **A. Wightianus,** *Steud. Syn. Gram.* 395; leaves linear acute glabrous or pubescent spinulosely serrulate, lower sheaths compressed, rachis and branches of panicle minutely hairy, sessile spikelets ⅛ in., callus long densely bearded all round, gl. I laterally compressed above, minutely truncate glabrous below hispid above, II long-awned hispid above on the keel and sides, awn of IV 2–2⅓ in., pedicelled spikelets lanceolate pubescent much longer than the sessile. A. aristulatus, *Hochst. ex Steud. Syn. Gram.* 397; *Hack. Monogr. Androp.* 556. A. breviaristatus, *Steud. l. c.* 396. Chrysopogon Esenbeckii, *Wight Cat.* n. 1805 (*non Steud.*). C. Wightianus, *Nees ex Steud. l. c.*; *Wight Cat.* n. 1676, *Herb.* 3398. Rhaphis orientalis, *Desv. Opusc.* 69. R. Wightianus, *Nees ex Steud. l. c.*—Chrysopogon, *Wall. Cat.* n. 8785 C. D.

MADRAS, *Wight, Griffith,* &c. NILGHIRI HILLS, *Schmid, Kuntze.* BURMA, *Kuntze* (*Hackel*).—DISTRIB. Anam.

Variable in habit; stems short or tall, erect or ascending from a short stout creeping stock. *Leaves* 3–10 in., rigid, from glabrous to pubescent on both surfaces and with sometimes tubercle-based hairs; sheath glabrous; ligule very short, villous. *Panicle* 3–5 in., contracted, lower branches long, few in a whorl. *Spikes* solitary, green or brownish. *Sessile spikelets* subcylindric; callus long, hairs rusty; gl. I obscurely 4-nerved, tip 2-dentate; II chartaceous, tip 2-lobed, awn as long as the gl. or shorter; III linear-oblong, 2-nerved, ciliate; IV awn with a narrowly dilated 2-lobed base, column hispid. *Pedicelled spikelets* nearly ½ in.; pedicel truncate, margins shortly villous; gl. I glabrous or pubescent, 7-nerved, awn longer than the gl., keels ciliate; II lanceolate, 3-nerved, awn as long as the gl. or shorter; III oblong, 2-nerved, ciliate; IV very narrow, ciliate, nerveless.—I have seen no Ceylon specimen of this species; Thwaites' C.P. n. 3248 in Herb. Kew, is a starved specimen of *A. zeylanicus*. Nor have I seen Burmese or Anam ones.

49. **A. distichopyllus,** *Hook. f.*; stem stout fastigiately branched, leaves distichous erecto-patent narrowly linear rigid smooth, sheaths terete, panicle very long-peduncled narrow, branches very unequal erect smooth with one terminal spike, sessile spikelets ⅓ in. callus elongate shortly villous all round, gl. I 2-cuspidate quite glabrous, II glabrous, awn of gl. IV 2½ in., pedicelled spikelets longer than the sessile lanceolate, gl. I glabrous 7-nerved keels ciliate at the tip only.

SOUTHERN BURMA; on the coast at Kobok, *Kurz.*

A perennial, apparently of bushy habit several feet high, branches rigid terete glabrous. *Leaves* 4–6 by $\frac{1}{10}$–$\frac{1}{8}$ in., striate, complicate, subpungent, margins smooth, ciliate towards the base; sheath appressed, smooth. *Panicle* 5–6 in.; peduncle 12 in.; rachis slender, smooth; branches strict, in distant fascicles rather than whorls, tips very oblique with erect beards; lower 1 in. long, rarely with 2 distant spikes. *Sessile spikelets* very narrow; callus $\frac{1}{8}$ in.; gl. I 4-nerved; II narrow, complicate, 3-nerved, tip 2-lobed, awn as long as itself; III linear-oblong, obtuse, ciliate; IV the very narrow hyaline 3-nerved base of the awn. *Pedicelled spikelets* nearly $\frac{1}{2}$ in.; pedicels $\frac{1}{3}$ shorter than the sessile spikelet, tip retuse, margins ciliate; gl. II 3-nerved, ciliate, shortly awned: III as in the sessile spikelet; IV 0.—I have seen but one specimen of this very distinct-looking plant.

§§§ *Glume I of pedicelled spikelets not awned, II not or very shortly awned.*

50. **A. zeylanicus,** *Nees ex Steud. Syn. Gram.* 397; leaves very long and narrow, panicle ovate-oblong, branches in few whorls spreading with 1–3 terminal spikes, rachis scaberulous, sessile spikelets $\frac{1}{5}$ in., callus long naked in front, gl. I not laterally compressed above, dorsally with 2 rows of cilia or spinules above the middle tip truncate, awn of gl. IV $\frac{3}{4}$–$1\frac{1}{4}$ in., pedicelled spikelets much longer than the sessile lanceolate 5-nerved glabrous keels eciliate. A. nodulibarbis, *Hochst. ex Steud Syn. Gram.* 396; *Hack. Monogr. Androp.* 553. A. peninsulæ. *Steud. l. c.* Chrysopogon Aruottianus, *Nees ex Steud. l. c.* 396. C. Wightianus, *Thw. Enum. Pl. Zeyl.* 366 (C.P. 3248) (*excl.* var. β); *Trim. Cat. Ceyl. Pl.* 108 (*non Nees*). C. zeylanicus, *Thw. l. c.* (C.P. 996) (*non Steud.*). Rhaphis zeylanica, *Nees ex Steud. l. c.*—Chrysopogon, *Wall. Cat.* n. 8785 A. B.

NILGHIRI HILLS, alt. 7–8000 ft., *Wight*, &c. CEYLON, ascending to 6000 ft., *Walker*, &c.

Stems 1–3 ft., tufted, stout or slender. *Leaves* many from the base of the stem, 12–16 by $\frac{1}{20}$–$\frac{1}{6}$ in., flexuous, rather coriaceous, margins more or less laxly ciliate with rather long hairs; lower sheaths short, flattened, keeled; ligule of short hairs. *Panicle* 5–8 in., contracted or effuse, with long naked unequal lower branches. *Spikes* green or blueish. *Sessile spikelets*, callus $\frac{1}{10}$ in., hairs yellow or rusty brown; gl. I coriaceous, tip ciliate, often 2-toothed; nerves 2 pairs, obscure: II 3-nerved, tip 2-lobed, keel spinulosely ciliate above the middle; III oblong, obtuse, 2-nerved, retrorsely ciliate; IV the very narrow sub-2-lobed, 3-nerved, eciliate dilatation of the base of the awn. *Pedicelled spikelets* $\frac{3}{4}$ in.; pedicels truncate, margins shortly densely or laxly ciliate on one or both margins; gl. I narrowly lanceolate, keels minutely ciliate, nerves subequidistant or the lateral pairs submarginal; II acuminate, 3-nerved, retrorsely ciliate; III oblong, obtuse, 2-nerved, retrorsely ciliate; IV smaller, ovate-lanceolate, 1–3-nerved, ciliate.

** Pedicel of upper spikelets not half as long as the sessile spikelets.

51. **A. monticola,** *Schult. Mant.* iii. 665; stem erect or ascending usually very slender, leaves very narrow glabrous, lower sheaths compressed, panicles rather short of several whorls of few or many capillary flexuous very unequal branches bearing solitary spikes, sessile spikelets pale, callus short, gl. I compressed glabrous or keel ciliate above the middle, II dorsally more or less ciliate with short or long rigid bristles, awn of IV $\frac{1}{2}$–1 in. capillary, pedicelled spikelets lanceolate awned or not 7-nerved, pedicels = $\frac{1}{4}$–$\frac{1}{3}$ the sessile spikelet margins more or less villous.

WESTERN HIMALAYA, from Kashmir to Nepal, ascending to 6000 ft. Hilly

districts, from the PANJAB to BEHAR and southwd. to CEYLON. BURMA, *Collett.*—DISTRIB. Affghanistan, S. Africa.

Stems tufted, 1–3 ft., simple or branched, usually almost filiform, rarely as thick as a crow-quill or stouter. *Leaves* 6–18 in., rarely more than ⅛ in. broad, finely acuminate, quite smooth above and beneath, margins minutely scaberulous; upper sheaths terete, lower more or less compressed, sometimes very much so and membranous. *Panicle* 2–4 in., rarely more; rachis flexuous; branches in whorls of 3–12, rarely more, smooth or scaberulous, lowest ¼–1 in. or more, upper shorter; all quite smooth, or in the lower part together with the rachis scaberulous, rarely scaberulous throughout. *Spikes* very variable in size; the green blue and purplish or brown pedicelled always longer than the pale sessile. *Sessile spikelets* ⅛–¼ in.; callus hairs short or long, from white to rusty red; gl. I narrow, strongly compressed, margins membranous, tip rounded; II broader, tip 2-fid, with a short recurved awn, keel obtuse from glabrous to hirsute for a greater or less part of its length, with rigid or flexuous rufous or white bristles, margins membranous hardly ciliate; III hyaline, oblong, obtuse, ciliate; IV the long narrow hyaline 3-nerved eciliate dilatation of the awn. *Pedicelled spikelets* ⅕–⅓ in., neuter or male, from ovate- to linear-lanceolate, acuminate; pedicels cuneate, margins sparsely or densely villous, the upper hairs in some of the most densely villous nearly equalling the spikelet from dark rusty red to white; gl. I thin, acute acuminate or awned, the awn equalling or shorter than the gl., glabrous or pubescent; nerves always 7, subequidistant, or 2 on each side sub-carinal; margins narrowly incurved, spinulosely ciliate or smooth; II lanceolate, acuminate, ciliate; III hyaline, oblong, obtuse, 2-nerved or nerveless; IV shorter, narrower, hyaline, 1–3-nerved.—I am unable to classify the varieties of this common and variable plant in accordance with geographical areas or other considerations. This, if possible, must be effected by field botanists in India. There is every gradation from the coarsely hirsute keel of *monticola*, to the perfectly smooth of some states of *Trinii*; from the awnless to long awned gl. I of the pedicelled spikelets, and from the glabrous to the pubescent of the same organ; the colour of which affords no character; nor does its length, or that of the cilia on its keels.

Var. *monticola proper*; gl. II of sessile spikelet villous for more or less of its length with long flexuous usually rufous rigid bristles. A. monticola, *Schultes l. c. Kunth Enum. Pl.* i. 506; *Steud. Syn. Gram.* 395; *Hack. Monogr. Androp.* 557 (*excl. var. villosus*). A. aciculatus, *Herb. Wight ex Wall. Cat.* n. 8782 B. A. montanus, *Koen. in Herb. Banks.* A. Sprengelii, *Kunth Revis. Gram.* 166. Chrysopogon montanus, *Trin. in Spreng. N. Entdeck.* ii. 93; *Trim. Cat. Ceyl. Pl.* 108. Pollinia fulva, *Spreng. Pugill.* ii. 93.—Chrysopogon, *Wall. Cat.* n. 8782.

Var. *Trinii*; gl. II of sessile spikelets glabrous or shortly ciliate, hairs of callus and pedicels often very pale reddish or white. A. Trinii, *Steud. Syn. Gram.* 395; *Hack. Monogr. Androp.* 558. A. ciliolatus, cœrulens, and increscens, *Steud. l. c.* Chrysopogon ciliolatus, *Boiss. Fl. Orient.* v. 458 (*excl. var. β.*); *Duthie Grass. N. W. Ind.* 22. C. cœruleus, *Duthie l. c.* 23, *Fodd. Grass. N. Ind.* 39, t. 60. C. increscens, *Nees ex Steud. l. c.* 396. C. Wightianus, *var.* leucanthus, *Thw. Enum. Pl. Zeyl.* 366; *Trim. Cat. Ceyl. Pl.* 108. C. serrulatus, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1833) 318, *Sp. Gram. Ic.* t. 331; *Duthie l. c.* Rhaphis ciliolata and cœrulea, *Nees ex Steud. l. c.* 396, 395.—Chrysopogon, *Wall. Cat.* n. 8788, 8791.

Var. *robustus*, stem tall stout 2–4 ft. and upwards, as thick as a goose-quill below, leaves 8–10 by ¼ in., rather coriaceous, tapering from the base to the tip, scaberulous above, glaucous beneath; upper sheath 4–6 in. loose, terete keeled, panicle 6 in., sessile spikelets ⅛ in. keel of gl. II hispidly ciliate from base to apex, awn of gl. IV 1½ in., pedicelled spikelets ⅕–⅓ in. lanceolate awned, gl. I awned dorsally pubescent, keels ciliate. Chrysopogon serrulatus, *Herb. Strach. & Winterb.* —Central India, Goona (*Herb. Hort. Calcutt.*) Kumaon, alt. 5500 ft. *Strachey & Winterbottom.*

52. **A. Hackelii,** *Hook. f.*; stem tall stout, leaves narrow finely acuminate, panicle oblong, rachis strict, branches smooth crowded in many superposed whorls short very unequal smooth spreading simple each with a solitary spike, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. golden yellow, callus very short beard fulvous brown, gl. I obtuse glabrous, II glabrous awned, awn of IV $\frac{3}{4}$–1 in., pedicelled spikelets rather shorter than the sessile, gl. I oblong acute quite glabrous 5–7-nerved not awned keel eciliate, II shortly awned.—Chrysopogon, *Wall. Cat.* n. 8783. *Wight Herb.* n. 1030 (*in Herb. Kew*).

Travancore, *Wight.* Nilghiri Hills; Gondaloo Ghat, alt. 4500 ft., *Lawson.* *Stem* 4–5 ft., or more, as thick as a goose-quill below, leafy, quite smooth, branching upward, branches erect. *Leaves* 2–3 ft., by $\frac{1}{6}$–$\frac{1}{4}$ in, coriaceous, smooth, pale glaucous green, striate, margins sub-scaberulous; sheath subterete, keeled, smooth, glabrous; ligule a ridge of hairs. *Panicle* 4–6 in.; branches in 6–10 whorls, $\frac{1}{3}$–$\frac{2}{3}$ in. apart, the longest about 1 in. long, rather stiff, tips hardly oblique, beard of spreading rufous hairs. *Spikes* solitary. *Sessile spikelets* yellow; gl. I 4-nerved, polished; II subcymbiform, tip 2-lobed, 3-nerved, margins ciliolate, keel rounded and thickened, awn shorter than the gl.; III linear-oblong, obtuse, hyaline, ciliate, nerveless; IV very narrow, 1–3-nerved, hyaline, base and column of awn brown. *Pedicelled spikelets* pale green; yellow or purplish, male, pedicels = $\frac{1}{3}$ nearly $\frac{1}{2}$ the sessile spikelets truncate, margins densely villous with long rufous hairs, the upper of which = half the spikelets, gl. I thin, nerves subequidistant, or 2–3-nate pairs submarginal margins narrowly incurved; II lanceolate, 3-nerved ciliate; III oblong, 2-nerved, ciliate; IV narrowly lanceolate, 1-nerved ciliate.—A very handsome plant with a bright golden panicle. Wight's n. 1030 (which is not a catalogue number) is referred by Hackel to *A. Trinii* var. *increscens*, with the locality Courtallam, taken from Steudel. It differs from the n. 1030 in Herb. Kew in the villous sheaths with tubercle-based hairs, the leaves hairy on both surfaces and panicle branches 4–8, and is no doubt rightly referred to *Trinii*.

53. **A. velutinus,** *Hook. f.*; stem not tall compressed, leaves linear broad flat acuminate puberulous on both surfaces, sheaths strongly compressed keeled, panicle with flexuous rachis and short flexuous scaberulous branches minutely bearded at the truncate tips, sessile spikelets pale, callus very short rufous bearded, gl. I compressed keel ciliolate above the middle, keel of II hirsute, awn of IV 1 in., pedicelled spikelets oblong truncate strongly 7-nerved not awned keels ciliate dorsally glabrous or hirsute, pedicels very short. Chrysopogon velutinus, *Arnott in Herb. Wight* n. 2314.

Mysore; at Cuddapah, *Wight.*

Stems 18 in. high, rather stout, soft, tufted, leafy from the base. *Leaves* 6–10 by $\frac{1}{4}$-$\frac{1}{3}$ in., distichous, flaccid, 5–9-nerved, slender midrib beneath and margins spinulosely ciliolate and with a few long hairs at the base; lower sheaths equitant, $\frac{1}{3}$ in. broad, strongly compressed and keeled, keel spinulosely ciliate, upper sheaths finely pubescent. *Panicle* (imperfect) $2\frac{1}{2}$ in., branches $\frac{1}{3}$–1 in. *Sessile spikelets* $\frac{1}{5}$ in., pale yellow; gl. I with minutely ciliolate margins; II margins eciliate, gls. III and IV in both sessile and pedicelled spikelets as in *A. monticola*.—I have seen only one specimen of this plant which differs widely in habit and foliage from any form of *A. monticola*, in the broad flat flaccid pubescent leaves and sheaths. It is a native of a botanically unexplored district.

54. **A. polyphyllus,** *Hack. mss. in Herb. Duthie*; stem simple or fastigiately branched quite glabrous, leaves many long narrow rigid acuminate flat pale glaucous-green glabrous coriaceous, sheaths terete,

panicle oblong subsecund dense-fld. very pale, branches many short in many closely approximate whorls smooth, sessile spikelets $\frac{1}{6}$ in., callus long obtuse bearded at the very base only with long fulvous hairs, gl. I obtuse glabrous, keel ciliate towards the tip, II not awned keel glabrous or ciliate, awn of IV $\frac{1}{8}$–$\frac{1}{3}$ in. nearly straight pale, pedicelled spikelets narrowly lanceolate acuminate glabrous 7-nerved eciliate not awned, pedicels naked villous at the tip only. A. Aucheri, *var.* polyphyllus, *Hack. in Herb. Duthie.*

CENTRAL PROVINCES; Khandua, Chanda, and Jubbulpore districts, by the Nerbudda and Indravati rivers, &c., *Duthie.*

Stem 2–3 ft., stiff, as thick as a crow-quill or more. *Leaves* crowded, or not, 6–10 by $\frac{1}{12}$–$\frac{1}{6}$ in., pale glaucous-green and smooth on both surfaces, midrib and nerves very slender, margins minutely scaberulous; sheaths appressed, hard. *Panicle* 4–5 in.; branches $\frac{1}{4}$–$\frac{1}{2}$ in., very unequal; peduncle slender, quite glabrous. *Spikes* drooping, white or pale purplish. *Glumes* as in *A. monticola*. *Pedicelled spikelets* rather longer than the sessile; pedicels = about $\frac{1}{3}$? the sessile spikelets.—Habit, foliage and secund panicle very unlike *A. monticola*, and remarkable for the stout naked callus about $\frac{1}{10}$ in. long with a long-bearded base, and the naked pedicels villous at the tip only with erect fulvous hairs half as long as the spikelets. It differs from *Aucheri*, in the tall habit, long-glabrous glaucous foliage, glabrous peduncle and branches of the panicle, callus, pedicels, awnless pedicelled spikelets, and the very short awn of gl. IV of the sessile spikelet.

55. **A. Aucheri,** *Boiss. Diagn. Ser.* I. v. 7; densely tufted, basal sheaths silky, leaves short linear pubescent, sheaths terete very pale silky peduncle pubescent below the oblong panicle, branches in approximate whorls short very unequal scaberulous, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. callus long villous all over with long pale silky hairs, gl. I glabrous or keel and tip ciliate, keel of II hirsute, awn of IV $\frac{2}{3}$–1 in. pale, pedicelled spikelets longer than the sessile narrowly lanceolate 5–7-nerved, keels ciliate and with a long ciliate awn, pedicels = $\frac{1}{3}$ the sessile spikelet silkily villous. A. Aucheri, *a.* genuinus, *Hack. Monogr. Androp.* 560. Chrysopogon ciliolatus *β.* Aucheri, *Boiss. Fl. Orient.* v. 458.

SCIND; near Kurrachee, *Stocks.*—DISTRIB. Affghanistan, N. Africa.

Stem 6–18 in., simple or sparingly branched, base thickened, leafy. *Leaves* 2–4 by $\frac{1}{10}$–$\frac{1}{6}$ in., sometimes undulate, acute or acuminate, pale green, often ciliate towards the base, margins scaberulous; sheath very pale. *Panicle* 2–3 in., erect, long-peduncled, rachis scabrid. *Spikes* usually crowded, rarely binate on a branch. *Sessile spikelets*; callus obtuse; gl. I compressed, with sometimes long terminal bristles; II awned or not, awn hirsutely ciliate; III and IV as in *A. monticola*. *Pedicelled spikelets* $\frac{1}{5}$–$\frac{1}{4}$ in., pedicels silkily villous from base to apex; gl. I sparsely ciliate dorsally, and with very long cilia on the keels towards the tip, awn pale hirsute.—I have confined the description to the Scind plants. Hackel describes the species, which extends to Persia, Arabia, Morocco, and S. Africa as extraordinarily variable, no two specimens agreeing in all points, and the spikelets varying in the same specimen. These remarks would probably apply to all the allied species of *Chysopogon*, in whose stability I have no confidence.

Subgen. IX. DICHANTHIUM, *Hack.* *Spikes* digitate, rarely solitary or panicled, subsessile or stipitate on the peduncle, joints many and pedicels linear filiform dorsally flat compressed; lower 1–4 pairs of spikelets homogamous (except sometimes in *A. annulatus*) male or neuter. *Sessile spikelets* dorsally compressed; gl. I with the margins usually inflexed and

keeled above and involute or not below; II keeled, awnless; III hyaline; IV a naked awn, its base rarely narrowly hyaline, or 2-fid and awned in the cleft. *Pedicelled spikelets* like the sessile, but male or neuter, awnless.

* *Glume IV of sessile spikelets a simple awn, acute at the base.*

56. **A. caricosus,** *Linn. Sp. Pl. Ed.* ii. 1480 (*excl. Syn. Rumph.*); stem erect or decumbent below, leaves narrowly linear, sheaths compressed, spikes 1–4 in. solitary binate or subdigitately panicled, spikelets closely subdistichously imbricate, joints and pedicels $\frac{2}{3}$ shorter than the sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in., gl. I of sessile spikelets obovate or oblong tip truncate denticulate dorsally more or less villous, keels with ciliate wings, II obtuse 3-nerved, III ovate-oblong ciliate. *Hack. Monogr. Androp.* 756.

Plains and low hills of India, from Scind to Burma and the Andaman Islds. (not in N.W. India) and southwd. to Ceylon.—Distrib. Mauritius, China.

Stem 1–2 ft., erect or ascending from a creeping base, often much branched, stout or slender, even capillary, grooved on one side, leafy; nodes bearded or not. *Leaves* 6–8 by $\frac{1}{10}$–$\frac{1}{4}$ in., finely acuminate, glabrous or ciliate, margins scabrous, sheaths smooth; ligule membranous. *Spikes* inclined, often flexuous, $\frac{1}{8}$–$\frac{1}{4}$ in. broad, silvery, lower sometimes stipitate; joints and pedicels = $\frac{1}{3}$ the spikelet, ciliate on one margin; callus short, broad. *Sessile spikelets* 5–7-nerved, margins gl. I. broadly incurved below, narrowly above; II narrow, 3-nerved, apiculate, margins ciliate, keel scaberulous; III ovate-oblong, hyaline, nerveless; IV awn $\frac{3}{4}$–1 in., column scabrid. *Pedicelled spikelets* smaller than the sessile; gl. I broadly oblong, silkily ciliate; II ovate-lanceolate, acute, ciliate.—A very variable grass, of which there are two principal forms.

Var. *genuinus*, Hack.; stem glabrous below the usually solitary spike, gl. I smooth above hairy towards the base. A. caricosus, *Linn.*; *Trim. Cat. Ceyl. Pl.* 108. A. binatus & tenellus, *Roxb. Fl. Ind.* i. 254, 255; *Steud. Syn. Gram.* 372, 371. A. filiformis, *Pers. Syn.* i. 103. A. serratus, *Retz. Obs.* v. 21; *Trin. Sp. Gram. Ic.* t. 329; *Roxb. Fl. Ind.* 253; *Steud. l. c.* 366. Lepeocercis serrata, *Trin. Fundam. Agrost.* 203; *Wight Cat* n. 1687, *Herb. Prop.* n. 1687. Heteropogon concinnus, *Thw. Enum. Pl. Zeyl.* 368.

Var. *mollicomus*, Hack.; stem pubescent below the spikes, gl. I 3-toothed dorsally hairy all over. A. australis, *Poir. Encycl. Suppl.* i. 585. A. barbatus & pertusus, *Herb. Ham. ex Wall. Cat.* n. 8809 B. C. A. curvatus, *Herb. Russ. ex Wall. Cat.* n. 8809 A. A. incurvatus, *Kœn. ex Trin. in Spreng. Entdeck.* ii. 91. A. Kœnigii, *Steud. Syn. Gram.* 381. A. mollicomus, *Kunth Revis. Gram.* i. 365, *Enum. Pl.* i. 497. Lepeocercis digitatus, *Royle Ill. Bot. Himal.* 416. Dichanthium nodosum, *Uteri Annal.* xviii. (1796) 11. Diplasanthera lanosum, *Desv. Opusc.* 67, t. 5, f. 1.—Andropogon, *Wall. Cat.* n. 8809, 8810 F. H. *Wight Cat.* n. 1687.

57. **A. annulatus,** *Forsk. Fl. Æg. Arab.* 173; densely tufted, leaves narrowly linear, sheaths terete, spikes subdigitately fascicled, peduncles glabrous, joints and pedicels slender laxly ciliate, sessile spikelets $\frac{1}{8}$–$\frac{1}{5}$ in., gl. I oblong obtuse or truncate flat or convex 5–9-nerved keels ciliate above not winged glabrous or more or less villous with long spreading hairs, II acute, keel smooth except below, III oblong obtuse glabrous. *Del. Fl. Egypt.* iii. t. 7, f. 2; *Kunth Enum. Pl.* i. 498 (*excl. Syn.*); *Steud. Syn. Gram.* 380; *Hack. Monogr. Androp.* 570; *Wight Cat.* n. 1697; *Aitchis. Cat. Panjab. Pl.* 175; *Duthie Fodd. Grass. N. Ind.* 33, t. 20; *Benth. Fl. Austral.* vii. 531; *Boiss. Fl. Orient.* v. 463. A. Bladhii, *Retz. Obs.* ii. 27; *Kunth l. c.* 498; *Trin. Sp. Gram. Ic.* t. 325; *Roxb. Fl. Ind.* i. 259; *Wight Cat.* n. 1698; *Aitchis. l. c.*; *Duthie Grass. N.W. Ind.* 19. A. comosus, *Link Enum. Hort. Berol.* i. 239. A. garipensis, *Steud. l. c.* 379. A. Ischæmum, *Roxb. ex Wight Cat.* n. 1697. A. obtusus, *Nees*

in Hook. & Arn. Bot. Beech. Voy. 243 (*excl. Syn. Roxb.*). A. scandens, *Roxb. l. c.* 258; *Kunth l. c.* 498; *Grah. Cat. Bomb. Pl.* 238; *Dalz. & Gibs. Bomb. Fl.* 301; *Duthie l. c.* 21. Lepeocercis annulata, *Nees Fl. Afr. Austr.* 98.—Andropogon, *Wall. Cat.* n. 8810 C. E. G.

Throughout the hills and plains of INDIA, from Kashmir westward to Bengal and southward (not in Ceylon).—DISTRIB. Trop. Africa, China, Australia, Pacific.

Stems usually woody at the base with strong wiry roots and tufted leaves, then geniculately ascending, 6–36 in.; nodes bearded or not. *Leaves* 3–12 in., rigid, glaucous, glabrous or hairy above with tubercle-based hairs, margins scabrid; sheath bearded at the tip; ligule oblong, obtuse. *Spikes* 1–2½ in., straight or flexuous, usually inclined, pinkish or nearly white, joints and pedicels = ½ the spikelets, slender, rigid, margins shortly ciliate. *Spikelets* very variable in size, closely imbricating; callus shortly bearded; gl. I thin, nerves strong or faint, not reaching the tip; II lanceolate, 3-nerved, glabrous or ciliolate; III narrow, glabrous; IV awn ¾–1 in., column scabrid. *Pedicelled spikelets* about = the sessile; gl. I obtuse or acute, 7–11-nerved, keels bristly; II narrower, 3-nerved; III ciliate; IV minute or 0.—A very common Indian grass, of which Hackel distinguishes three Indian varieties, to which I have added a fourth :—

Var. *genuinus*; spikes 3–10, gl. I of sessile spikelets beset with rigid tubercle-based hairs, of pedicelled dorsally hairy all over.

Var. *decalvatus*; gl. I of sessile spikelets glabrous, of pedicelled often papillose.

Var. *Bladhii*; spikes many, lower long-stipitate, gl. I of sessile spikelets glabrous or loosely hairy.

Var. *papillosus*; spikes 3–8 decurved, gl. I of sessile spikelets with a transverse row of tubercle-based hairs below the tip. A. papillosus, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 457; *Hack. l. c.* 573.—Behar on Parusnath, *Clarke.*—Afr. trop.

58. **A. Clarkei,** *Hack. in Œsterr. Bot. Zeitschr.* xli. (1891) 49; annual, very slender, much branched, leaves 2–4 in. linear-lanceolate, spikes solitary on capillary peduncles from spathiform sheaths, joints and pedicels slender silkily villous sulcate, spikelets subdistichous, sessile silkily villous with white hairs, gl. I elliptic-oblong flat truncate 2-toothed, keels scaberulous, IV a simple awn, gl. I of pedicelled spikelets rather larger narrower red-brown glabrous.

BEHAR; on Parusnath, alt. 4200 ft., *Clarke.*

Stems 12–18 in., leafy, nodes bearded. *Leaves* flat, finely acuminate, base contracted, quite smooth, nerves very slender; sheaths long, slightly tumid, mouth contracted; ligule of hairs. *Spikes* ⅔–1 in. long, flattened, joints and pedicels sulcate, slender. *Spikelets* 6–8 pairs; two lowest pairs neuter. *Sessile spikelets* ⅛ in.; callus very short; gl. I thinly chartaceous, 7-nerved, margins narrowly inflexed; II narrowly cymbiform, acuminate, 3-nerved, margins ciliate; III oblong, obtuse, hyaline, ciliate; IV the slender awn ½–1 in. long. *Pedicelled spikelets* ⅕ in., dark brown; gl. I obtuse or emarginate, many-nerved; II 3-nerved; III smaller.—The white sessile and dark pedicelled spikelets are a marked feature.

59. **A. armatus,** *Hook. f.*; annual, tufted, erect, leaves linear copiously hairy, spikes 2–5 subdigitate long-peduncled, joints and pedicels slender not grooved, spikelets 10–20 pairs, gl I of sessile oblong obtuse sometimes alveolate dorsally densely silky below the middle keels ciliate, IV a simple awn, gl. I of pedicelled spikelet armed with spreading submarginal tubercle-based bristles twice or thrice its own length.

The CONCAN, *Stocks.*

Stems 12–18 in., as thick as a sparrow's quill, simple or branched above; nodes bearded. *Leaves* 4–6 by ⅛–¼ in., flaccid, nerves slender, base rather contracted, softly hairy on both surfaces and with long tubercle-based bristles at the base;

sheaths lax, upper smooth pale spathiform; ligule 0. *Spikes* ½–1½ in., flexuous, nodding or cernuous silvery-green, lowest pairs of spikelets male; peduncles ⅙–⅓ in., capillary, axils with whorls of long white hairs; rachis and pedicels slender, terete, silkily ciliate, upper hairs long. *Sessile spikelets* ⅛ in.; callus very short, silkily bearded; gl. I thin, pale, nerveless, with often a large deep dorsal pit, margins narrowly incurved; II acute, nerveless, dorsally silkily villous; III oblong or linear, flat, hyaline, obtuse, nerveless; IV, awn about 1 in., slender, nearly smooth, base acute. *Pedicelled spikelets* ⅕ in. rather narrower than the sessile; gl. I slightly convex, quite smooth between the bristles, keels ciliate, many-nerved; II ovate-oblong, 3-nerved, ciliate; III oblong, obtuse, eciliate; IV very narrow.

60. **A. mucronatus,** *Anderss. ex Hack. Monogr. Androp.* 577; stem tall stout, internodes alternately flattened, sheaths terete, leaves linear-lanceolate acuminate pubescent, spikes 5–10 flabellately panicled, sessile spikelets ⅕ in. twice as long as the joints and ciliate pedicels, callus hairs half as long as the glumes, gl. I coriaceous obovate-lanceolate obtuse glabrous shining 6-nerved pitted in the middle, keels setose above the middle, II as long lanceolate acute glabrous except the ciliate margin 3-nerved, IV a stout awn, gl. IV of pedicelled spikelets awned or mucronate.

India? *Hugel.*

Stem 3-4 ft. or taller, simple, nodes 4, bearded. *Leaves* flat, base fimbriate; sheaths smooth; ligule rounded, ciliolate. *Spikes* solitary or opposite, shortly peduncled, lower pair of spikelets male. *Spikelets* yellow-green; gl. I not hyaline at the tip; II obscurely keeled, dorsally shining; III linear-lanceolate, nerveless, ciliate; IV awn ¾ in. long, stout; palea minute. *Pedicelled spikelets* rather longer and broader than the sessile; gl. I obliquely elliptic-oblong, violet-colrd., keels setosely ciliate nearly to the base, 13-nerved; II narrower, lanceolate, acute, 5-nerved, ciliate; III obovate-oblong, 1-nerved, ciliate; IV as long, linear, 1-nerved, glabrous.—Description from Hackel, who says it is a peculiar species, not allied to the preceding, but rather to *A. polyptychus.*

** *Gl. IV of sessile spikelet 2-fid, awned in the cleft.*

61. **A. polyptychus,** *Steud. Syn. Gram.* 380; stem slender erect simple or branched below only, leaves erect strict softly hairy acuminate, sheaths subcompressed, spikes 4–6 digitate simple or forked, joints and ciliate pedicels half as long as the sessile spikelets, gl. I of sessile spikelets narrowly elliptic-oblong obtuse 4–7-nerved nearly flat glabrous, margins narrowly incurved, keels strongly ciliate above, II as long mucronate 3-nerved ciliate, IV very narrow with 2 setaceous or lanceolate lobes. *Thwaites Enum. Pl. Zeyl* 367; *Trim. Cat. Ceyl. Pl.* 108; *Hack. Monogr. Androp.* 578.

Ceylon; at Pedrotallagalla, alt. 7000 ft., *Thwaites.*

Stems densely tufted, 2–3 ft., as thick as a crow-quill below, smooth. *Leaves* 8–16 in. by $\frac{1}{10}$–¼ in., rigid, erect; ligule short, rigid. *Spikes* usually 3, very fragile, 2 in. long, shortly peduncled, joints and pedicels not furrowed; axils hairy; spikelets closely imbricate, lowest pair male or neuter. *Sessile spikelets* ⅕ in., callus very short, shortly bearded; gl. I not winged, sometimes depressed on the median line; II 3-nerved, glabrous except the margins, acute or aristulate; III oblong-lanceolate, acute, 1-nerved; IV rather shorter, nearly glabrous, awn ½–¾ in. very slender; palea minute, broadly ovate, ciliate. *Pedicelled spikelets* broader than the sessile; gl. I convex, many-nerved, narrowly winged on one side, tip membranous, keels ciliate; II oblong, acute, 1-nerved, ciliate; III and IV small, oblong, obtuse, 1-nerved, shortly ciliate.

62. **A. nitidulus,** *Hook. f.*; annual, very slender, branched, leafy, leaves long narrow flaccid scaberulous base contracted, spikes very few very unequal on a long capillary peduncle white, rachis tenacious, sessile spikelets ovate-oblong 9-nerved dorsally flat glabrous or scabrid towards the hyaline truncate tip, keels ciliate towards the tip, II 5–7-nerved acuminate, IV short broadly 2-lobed, awn very slender.

N.W. HIMALAYA; on the Sewalik Hills; and Chanda in the CENTRAL PROVINCES, *Duthie.*

Stems 3–4 ft., loosely tufted, very slender from the naked base upwards, nodes glabrous. *Leaves* 8–12 by $\frac{1}{6}$–$\frac{1}{4}$ in., acuminate, thin, margins scaberulous ciliate towards the base, midrib slender smooth, nerves very slender; sheath smooth; ligule oblong, membranous, ciliate. *Spikes* quite white, the terminal on the peduncle 1–$1\frac{1}{2}$ in., lower rather distant, sessile, much shorter; peduncle 4–8 in.; joints and pedicels = about $\frac{3}{4}$ the sessile spikelet, very slender, ciliate with long white silky hairs, tips truncate, joints terete, pedicels flattened (almost as in Sect. *Amphilophis*). *Spikelets* few, in rather distant pairs, homogamous pairs one or two. *Sessile spikelets* $\frac{1}{6}$ in., callus very short, stellately bearded with white hairs; gl. I thin, greenish, dorsally polished, margins narrowly incurved; II chartaceous lanceolate, 5–7-nerved, margins broadly incurved, ciliate; III smaller, lanceolate, 2-nerved, ciliate; lobes of IV ovate, acute, divergent, ciliate; awn about $\frac{1}{2}$ in., slender, column quite smooth. *Anthers* short. *Pedicelled spikelets* rather longer than the sessile, narrowly lanceolate, green, neuter; gl. I membranous, 9-nerved, glabrous, margins incurved, ciliate towards the tip only; II 7-nerved; III rudimentary or 0.

Subgen. X. HETEROPOGON, *Hack.* *Spikes* solitary, joints many and pedicels not channelled; lowest pairs or 2–8 pairs of spikelets closely imbricate, male or neuter. *Sessile spikelets* subcylindric, gl. I subcylindric or oblong, II obtusely keeled, not awned; III hyaline; IV a long awn with a stout column and often a hyaline base. *Pedicelled spikelets* very unlike the sessile and concealing them.

* *Ligule membranous; column of awn hirsute; callus of sessile fem. spikelets pungent.*

63. **A. contortus,** *Linn. Sp. Pl.* 1045; leaves scabrid above, ligule truncate ciliolate, spikes $1\frac{1}{2}$–3 in., sessile fem. spikelets $\frac{1}{4}$ in., callus long rufous-bearded, gl. I dorsally flat, margins smooth involute, awn 3–5 in., pedicelled spikelets $\frac{1}{3}$–$\frac{2}{3}$ in., gl. I obliquely lanceolate obtuse. *Lamk. Encyc.* t. 840; *All. Fl. Pedem.* 260, t. 91; *Kunth Enum. Pl.* i. 486; *Steud. Syn. Gram.* 367; *Hack. Monogr. Androp.* 585 (*excl.* A. polystachyus, *Roxb.*); *Roxb. Fl. Ind.* i. 253; *Grah. Cat. Bomb. Pl.* 238; *Dalz. & Gibs. Bomb. Fl.* 300; *Wall. Cat.* n. 8800; *Wight Cat.* n. 1688, 2321, *in part*; *Baker Fl. Maurit.* 444. A. Allionii, *DC. Fl. Franc.* iii. 97. A. messanensis, *Biv. Pl. ined.* 5. A. Bellardi, *Bub. in Nuov. Giorn. Bot. Ital.* (v. 1873) 317. A. besukiensis, *Steud. l. c.* 307. Heteropogon Allionii, *Roem. & Sch. Syst.* ii. 835; *T. Nees, Gen. Fl. Germ. Monocot.* i. 94; *Reichb. Ic. Fl. Germ.* t. 53. H. contortus, *Beauv. ex Roem. & Sch. l. c.* 836; *Benth. Fl. Austral.* vii. 517; *Aitchis. Cat. Panjab. Pl.* 176; *Duthie Grass. N. W. Ind.* 19, *Fodd. Grass. N. Ind.* 32, t. 19. H. firmus, *Presl. Rel. Hænk.* i. 334. H. glaber, *Pers. Syn.* ii. 533; *Beauv. Agrost.* 24, t. 23, f. 8. H. hirtus, *Pers. l. c.*; *Thw. Enum. Pl. Zeyl.* 368; *Trim. Cat. Ceyl. Pl.* 107; *Benth. Fl. Hongk.* 424. H. hirsutus, *Beauv. Agrost.* 134. H. hispidissimus, *Steud. Syn. Gram.* 367. H Hohenackeri, *Hochst. ex Miq. Anal. Bot. Ind.* iii. 24. H. messanensis, *Guss. Fl. Sic. Syn.* i. 164. H. polystachyus, *Nees Agrost. Bras.*

364; *Wight Cat.* n. 2321 (*non Roxb.*). H. Roxburghii, *Arn. ex Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 183.

Throughout INDIA, BURMA, and CEYLON to the Straits of Malacca, ascending the Himalaya to 5000 ft.—DISTRIB. Mediterranean region and tropics generally.

Stems 1–5 ft., erect or decumbent below, densely tufted, simple or fastigiately branched, compressed towards the base. *Leaves* 6–18 in., narrow, glabrous or hairy especially near the base, rather glaucous, rigid, margins and upper surfaces scabrid; sheaths compressed, keeled. *Spikes* with the lower 2–6 pairs of spikelets male with coherent joints; joints of upper (fem.) portion very short and curved callus bearded with brown hairs. *Sessile (fem.) spikelets* ¼ in.; gl. I coriaceous, glabrous or hispid, many-nerved, tip membranous; II coriaceous, 3-nerved; III oblong, hyaline, embracing the long slender ovary, tip ciliate; IV awn stout, column hirsute. *Pedicelled spikelets* ⅓–½ in.; pedicel very short; gl. I lanceolate, obliquely twisted, herbaceous, keels margined or unequally winged; II membranous, acute, 3-nerved, ciliate; palea minute, ciliate. *Sessile spikelets* of the homogamous pairs, like the pedicelled, more or less covered with tubercle-based hairs.—Hackel has 2 varieties and 5 subvarieties (excluding *polystachyus*) of this widely distributed plant, founded chiefly on the number and position of the tubercle-based bristles of the male spikelet. They appear to me to be too inconstant for definition.

64. **A. melanocarpus,** *Ell. Sketch. Bot. S. Carolin.*, &c., i. 146; tall, stout; leaves scabrid above, sheaths of upper with scrobiculate keels and often nerves, ligule rounded glabrous, spikes ½–1 in., sessile fem. spikelets ⅓ in. terete hirsute, callus long rufous bearded, gl. I dorsally flat, awn 2–4 in., pedicelled spikelets ⅔–1 in. costa scrobiculate. A. polystichus, *Hochst. ex Steud. Syn. Gram.* 369. A. polystictus, *Hochst. in Schimp. Pl. Abyss.* n. 2012. A. scrobiculatus, *Kunth Enum. Pl.* i. 507. A. segænsis, *Steud. l. c.* 367 (*excl. cit. Wall.*) Heteropogon acuminatus, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1883) 254. H. melanocarpus, *Benth. in Journ. Linn. Soc.* xix. (1881) 71; *Duthie Grass. N.W. Ind.* 19. H. polystictus, *Hochst. in Flora*, xxxix. (1856) 28. H. Roylei, *Nees ex Steud. l. c.* 367. H. scrobiculatus, *Fourn. ex Hack. in Mart. Fl. Bras.* ii. III. 268.

UPPER GANGETIC PLAIN, *Royle*, &c. KUMAON, up to 5000 ft.—DISTRIB. Trop. and subtrop. Afric. and Amer.

Stem 4–6 ft., as thick as a swan's quill below, fastigiately branched above. *Leaves* 1–2 ft. by ¼–¾ in., setaceously acuminate, rigid, green, margins scaberulous, glabrous or with long hairs at the base; sheaths compressed, glabrous, upper spathæform, flattened. *Spikes* green, peduncle stout, in a narrow spathe 3–5 in. long, lower 1–3 pairs of spikelets male or neuter with coherent glabrous joints, upper pairs with fragile bearded joints. *Sessile* (fem. or bisexual) *spikelets* ⅓–½ in., callus long bearded; gl. I obscurely 9-nerved, not furrowed dorsally, margins smooth involute; II coriaceous, linear-oblong 3-nerved, keel hispid; III shorter, oblong, nerveless; IV awn stout, column hirsute. *Pedicelled spikelets* ⅓–½ in., obliquely lanceolate, acuminate, pedicel very short; gl. I many-nerved, glabrous, keels ciliate-serrulate; II lanceolate, acute; III much shorter, nerveless, ciliate; IV minute, linear. *Sessile spikelets* of homogamons pair like the pedicelled.

65. **A. triticeus**, *Br. Prodr.* 201; tall, stout, leaves sparsely hairy, sheaths of upper smooth, ligule very short, spikes 3–6 in., sessile fem. spikelets ½ in. terete, callus long rufous bearded, gl. I dorsally deeply channelled silkily pubescent, awn 3–6 in., pedicelled spikelets ⅔–1 in. smooth. *Hack. Monogr. Androp.* 588; *Steud. Syn. Gram.* 368. A. ischynanthus & lianauthus, *Steud. l. c.* 367. Heteropogon insignis, *Thw. Enum. Pl. Zeyl.* 437; *Trim. Cat. Ceyl. Pl.* 107; *Benth. Fl. Austral.* vii. 517.—Andropogon, *Wall. Cat.* n. 8801.

The CONCAN, *Stocks*, *Woodrow*. CENTRAL PROVINCES; Khandwa, *Duthie*. BURMA, at Segaen, *Wallich*. CEYLON; Mateke East, *Thwaites*.—DISTRIB. Malaya, Australia.

Stem 6–10 ft., as thick as a swan's quill below, hard, smooth, leafy. *Leaves* 1–2 ft., narrowly linear, acuminate, glaucous, above and margins scabrid; sheaths compressed, keeled, smooth; ligule ciliate. *Spikes* $\frac{1}{3}$–$\frac{1}{2}$ in., very stout, green; lower 12–15 pairs of spikelets homogamous, male or neuter, joints very short. *Sessile spikelets* $\frac{1}{2}$ in., cylindric, obtuse, callus long-bearded with rufous silky hairs; gl. I truncate; II obtuse; III glabrous; IV awn hirsute, very stout. *Pedicelled spikelets* $\frac{3}{4}$ in., green, pedicel very short; gl. I more or less twisted, lanceolate, many-nerved, one keel winged; II linear-lanceolate, margins ciliate; III and IV hyaline, short, glabrous. *Sessile spikelets* of the homogamous pair like the pedicelled.

** *Ligule of hairs*; *column of awn usually bearded*; *callus long.*

66. **A. bellariensis,** *Hack. in Flora* (1885) 123; stem tall sheathed to the top, leaves very narrow, sheaths terete, ligule of 2 rows of hairs, spikes 2–2$\frac{1}{2}$ in. slender partially sheathed, sessile fem. spikelets $\frac{1}{6}$ in., callus acute bearded with white hairs, gl. I linear-oblong dorsally channelled 6-nerved glabrous, awn 1–1$\frac{1}{2}$ in. base dilated and 2-toothed, pedicelled spikelets $\frac{1}{3}$ in. glabrous. Heteropogon polystachyon, *Arn. in Wight Cat.* n. 2321.

The DECCAN; near Bellary, *Wight* (*Cat.* n. 2321 *in part*).

Stem 2 ft., ascending, branched above, terete, glabrous. *Leaves* 6 in. or more, by $\frac{1}{8}$–$\frac{1}{6}$ in., rigid, green, quite smooth, puberulous above, setaceously acuminate; sheath glabrous. *Spikes* 2–3 in., slender, green, joints and pedicels shortly ciliate, lower 2–4 pairs of spikelets homogamous, male. *Sessile fem. spikelets* pale, callus straight pungent; gl. I chartaceous, glabrous, 6-nerved margins narrowly inflexed, keels scabrid, tip entire hyaline; II oblong-lanceolate, obtuse, 5-nerved, margins inflexed; III linear, nerveless, glabrous; IV awn stout, column ciliate with white hairs. *Pedicelled spikelets* $\frac{1}{3}$ in., lanceolate, shortly pedicelled; gl. I lanceolate, 7-nerved, glabrous; II narrower, 5-nerved, ciliate; III and IV very narrow, glabrous. *Sessile spikelet* of *homogamous pair* like the pedicelled.

67. **A. Ritchiei,** *Hook. f.*; leaves scabrid, ligule a row of stiff bristles connate below, spikes $\frac{2}{3}$–1 in. green, hispid, sessile fem. spikelets $\frac{1}{5}$ in., callus short hirsute, gl. I oblong, terete rufous villous dorsally not channelled, nerves obscure, IV awn 1$\frac{1}{2}$–2 in. scabrid base acute, pedicelled spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. very shortly pedicelled green, gl. I narrowly lanceolate acuminate many-nerved and with a marginal series of long spreading golden tubercle-based bristles.

The DECCAN; Belgaum, *Ritchie*.

Stem 4–6 ft. (one only seen). *Leaves* 1 ft. by $\frac{1}{3}$ in., coriaceous, linear from a narrow base, acuminate, flat, rigid, shortly hairy on both surfaces hairs fine tubercle-based, margins spinulosely serrulate; sheath smooth; ligule membranous? *Spikes* with peduncles shorter than the very narrow sheaths, stout; lower 1–2 pairs of spikelets homogamous. *Sessile fem. spikelets* softly villous; gl. I not channelled dorsally; II linear, 3-nerved, with a coriaceous hispid centre and membranous wings; III smaller, hyaline, nerveless; IV awn slender, tortuous, red brown, column pubescent. *Pedicelled spikelets* male, pedicels very short glabrous, gl. I narrowly equally winged, glabrous, except for the bristles, II lanceolate, 3-nerved; IV oblong, hyaline.—I have seen only the top of a branch with a single leaf of this remarkable species. The ligule is imperfect.

68. **A. oliganthus,** *Hochst. ex Steud. Syn. Gram.* 368; dwarf, annual, leaves subensiform acuminate softly hairy margins thickened, spikes short,

joints and pedicels about half as long as the sessile spikelet long-ciliate, sessile spikelet $\frac{1}{5}$ in. oblong, callus short obtuse, gl. I obtuse chartaceous dorsally villous toward the base not dorsally channelled shining faintly-nerved keels ciliolate towards the truncate tip, II obtuse apiculate, III very short broadly oblong ciliate, IV column of awn glabrous. *Hack. Monogr. Androp.* 591.

Nilghiri Hills; *Wight, Hohenacker, &c.*

Stems 3–6 in., tufted, slender, sometimes creeping below, geniculate. *Leaves* 2–3 in., quite flat, margins cartilaginous; sheaths compressed; ligule very short, membranous. *Spikes* usually very shortly exserted from the long narrow glabrous spathes; peduncle curved, puberulous. *Spikes* $\frac{1}{3}$–$\frac{2}{3}$ in. long, with 3–6 pairs of glumes, lower spikelets neuter. Gl. I of *sessile spikelets* with narrowly involute margins, callus bearded; awn of IV $1\frac{1}{2}$ in. long, shining. *Pedicelled spikelet* larger than the sessile; gl. I obovate-oblong, obtuse, many and strongly nerved, margins ciliolate hardly incurved: II smaller, membranous, obtuse, 1–3-nerved, ciliate; palea of IV very small.—Hackel observes that this species is intermediate between *Dichanthium* and *Heteropogon*, but nearer the latter in the dorsal furrow of the sessile spikelet (which furrow I do not detect).

69. **A. polystachyos,** *Roxb. Fl. Ind.* i. 261; dwarf, erect, corymbosely branched, leaves slender short erect strict hairy, spikes $\frac{1}{2}$–1 in. on slender strict naked peduncles, sessile fem. spikelets $\frac{1}{5}$ in., callus densely bearded on one side with brown hairs, gl. I terete pubescent, awn $1\frac{1}{2}$–2 in. base simple acute, pedicelled spikelets oblong many-nerved broadly winged glabrous. *Steud. Syn. Gram.* 367. A. pumilus, *Roxb. Ic. ined.* t. 2021 (*non Fl. Ind.*).

Peninsula of India, *Roxburgh, Wight.*

Stem 6–10 in., slender, leafy above. *Leaves* 2–4 by $\frac{1}{20}$–$\frac{1}{16}$ in., lower flat, upper convolute, acuminate, ciliate with long flexuous hairs, margins thickened; sheaths terete, lower keeled; ligule a line of hairs. *Spikes* pale brown (when dry), peduncle 2–4 in., with a very slender sheath and minute leaf about the middle; 5 or 6 lowest pairs of spikes neuter. *Sessile fem. spikelets* dark; gl. I rigid, many-nerved; II linear, coriaceous with broad hyaline margins; III shorter, oblong, ciliate; IV awn rather slender, column shortly hirsute. *Pedicelled spikelets* $\frac{1}{4}$ in.; gl. I with a coriaceous many-nerved centre and broad hyaline infolded wings; II lanceolate, ciliate, 5-nerved, 2 pairs submarginal. *Neuter spikelets*; gl. I like the pedicelled, but broader, tip 2-toothed; II lanceolate, 3-nerved, ciliate; III and IV oblong, 1-nerved, ciliate.—A curious little species, of which I have seen only indifferent specimens of Wight. In Roxburgh's Icones this and *A. pumilus*, Roxb., are figured on the same sheet with the names transposed. *Heteropogon polystachyon*, Arn. (Wight Cat. 2321) under which is cited Roxburgh's *A. polystachyon* is *A. bellariensis*, Hack.

Subgen. XI. Cymbopogon, *Hack.* *Spikes* 2, both sessile or a sessile and shortly stipitate terminating a peduncle which is more or less sheathed by a proper spathe, often divaricate or deflexed; joints and pedicels plano-convex, clavate bucciniform or linear, top concave with usually dilated toothed margins. *Spikelets* several pairs, lowest pair or pairs of one or both spikes homogamous, male or neuter; sessile spikelets fem. or bisexual, oblong to lanceolate, dorsally compressed; gl. I dorsally flat excavate or pitted, awnless, margins inflexed; II cymbiform, acute, keeled, awned or not; III oblong, hyaline, nerveless or 2-nerved; IV smaller, narrow, hyaline, 2-cleft, awned in the cleft, awn capillary, rarely 0; palea minute or 0. *Pedicelled spikelets* male or neuter, dorsally strongly compressed.

A. Column of awn of gl. IV glabrous (rarely awn 0).

* Peduncle of spikes shorter than the proper spathe.

† Joints of spikes and pedicels of upper spikelets copiously villous on the sides and back, hairs more or less concealing the sessile spikelet.

70. **A. Iwarancusa,** *Jones in Asiat. Research.* iv. (1795) 109; stem short or tall, leaves flat or convolute, panicle subsimple or decompound, joints of rachis and pedicels of upper spikelets subclavate tops toothed, sessile spikelets $\frac{1}{3}$–$\frac{1}{4}$ in. linear-lanceolate acute, gl. I dorsally flat glabrous, keels scaberulous or ciliolate.

Plains of N.W. INDIA, from the Jumna westwd., and southwd. to Scind. The WESTERN HIMALAYA, from Kashmir to Kumaon, and WESTERN TIBET, ascending to 8000 ft. N. CANARA and the DECCAN.—DISTRIB. Westwd. to N. Africa.

Stems tufted, on an annulate creeping rootstock, 6 in. to 6 ft. high; whole plant usually of a pale often glaucous green. *Leaves* 6 in.–2 ft., narrowly linear, tips capillary, rigid or flexuous, glabrous or scaberulous, glaucous or pruinose beneath, midrib slender; sheaths glabrous, lower dilated; ligule shortly oblong, membranous, ciliolate. *Panicle* very variable, branches distant or crowded, subsimple or much densely or loosely branched; proper spathes $\frac{1}{3}$–$\frac{2}{3}$ in., longer than the peduncle of the spikes, narrowly lanceolate. *Spikes* $\frac{1}{4}$–$\frac{3}{4}$ in., unequal; spikelets 3–4 pairs. *Sessile spikelets* pale, sometimes reddish; gl. I thin, keels hardly margined not winged, nerves 0 or 2–4 between the carinal; II cymbiform, acute, 3-nerved; III 2-nerved; IV narrow, lobes subulate, ciliate. *Pedicelled spikelets* as long as or rather longer than the sessile, purplish, narrowly lanceolate; gl. I 7–9-nerved, keels scaberulous; II margins ciliate; III broadly oblong, hyaline, fimbriate.—Roots aromatic. There are no limits between *A. Iwarancusa* and *laniger*. The former is usually the larger plant, with broader leaves and often split sheaths, and is the most Eastern form. The authority for the name *Iwarancusa* as a specific one is not very clear. Blane describing his *Nardus indica* says that Sir J. Banks regarded it as a species of *Andropogon*. Jones incidentally gives *Irawancusa* as the specific name; possibly he may have taken it from Banks.

Subsp. 1. A. IWARANCUSA proper; tall, much branched, leaves long flat, lower sheaths deciduous splitting into flat often tortuous laminæ, panicle narrow compound. *Kunth Enum. Pl.* i. 493; *Steud. Syn. Gram.* 388. *Hack. Monogr. Androp.* 599; *Roxb. Fl. Ind.* i. 275; *Ainslie Mat. Med. Ind.* ii. 114; *Wall. Cat.* n. 8793; *Trin. Sp. Gram. Ic.* t. 326; *Duthie Grass. N.W. Ind.* 19. Cymbopogon Iwarancusa, *Schult. Mant.* ii. 458.—Nardus indica, *Blane in Phil. Trans.* lxxx. (1790) 284, t. 16.—Common in N. India. I have seen no N. African specimens with the lower leaf-sheaths of this form, a character which is, however, very inconstant.—Khuskus grass.

Subsp. 2. A. LANIGER, *Desf. Fl. Atlant.* ii. 379; stem short subsimple, leaves junciform, lower sheaths hardened persistent, panicle narrow subsimple. *Kunth Enum. Pl.* i. 493; *Steud. Syn. Gram.* 386; *Hack. Monogr. Androp.* 598; *Aitchis. Cat. Panjab. Pl.* 174; *Duthie Grass. N.W. Ind.* 20, *Fodd. Grass. N. Ind.* 35, t. 23; *Lisboa in Bomb. Journ. Nat. Hist. Soc.* vi. (1891); *Boiss. Fl. Orient.* vii. 465. A. Arriani, *Edgew. in Journ. Linn. Soc.* vi. (1862) 208 (Ariani). A. circinnatus *Hochst. & Steud. ex Steud. l. c.* 387. A. criophorus, *Willd. Sp. Pl.* iv. 90. A. Olivieri, *Boiss. Diagn.* v. 76; *Steud. l. c.* 387. A. commutatus, *Aitchis. in Journ. Linn. Soc.* xix. (1882) 191 (*non Steud*). Cymbopogon arabicus, *Nees ex Steud. l. c.* C. circinnatus, *Hochst. in Schimp. Pl. Arab. exsicc. Ed.* 2 (1844) n. 783. C. Arriani, *Aitchis. l. c.* C. laniger, *Duthie in Atkins. Gaz. N.W. Ind.* 640. Gymnanthelia lanigera, *Anderss. in Schweinf. Beit. Fl Æthiop.* 300.—*A. laniger* is the N. African form of the species, also common in N. India. Edgeworth's *A. Arriani* is certainly this. The *A. commutatus* of Affghanistan and Scind (*Stocks*) is also

this; whether the African plant of that name is the same is doubtful. I have not seen the Scind specimens of *A. commutatus* alluded to by Hackel (Monogr. 613); it is not probable that they differ from Stocks' plant.

†† Joints of spikes and pedicels of upper spikelets villous or ciliate on the sides, hairs not concealing the sessile spikelets, dorsally glabrous or sparsely rarely copiously hairy.

§ *Leaf-sheaths terete.*

71. **A. Schœnanthus,** *Linn. Sp. Pl.* 1046; sessile spikelets ovate- or obovate-oblong dorsally flat or nearly so with a deep narrow longitudinal cleft in the centre usually below the middle and answering to a ventral median rib, keels narrowly winged from or from above the middle, II acute keel with a serrulate wing above the middle; *Kunth Enum. Pl.* i. 493; *Grah. Cat. Bomb. Pl.* 238; *Duthie Grass. N.W. Ind.* 21, *Fodd. Grass. N. Ind.* 38, t. 26.

Hotter parts of India, wild or cultivated, from the Panjab to Burma and southwd. to Travancore and Ceylon.—Distrib. Westwd. to tropical Africa.

Annual? *Stem* 3–6 ft., erect. *Leaves* long, broad or narrow, finely acuminate glaucous or pruinose, smooth or margins scaberulous, base rounded or cordate and amplexicaul; sheath glabrous; ligule oblong, scarious. *Panicle* elongate, 1–2 ft. long, dense or lax, compound or decompound, rarely subsimple; proper spathes as long as the spikes, which are as long as the peduncle or shorter. *Spikes* unequal, one 3–4-jointed, the other 4–6-jointed; joints and pedicels narrowly clavate, half as long as the sessile spikelet, tips dilated and toothed, margins villously ciliate with long hairs. *Sessile spikelets* $\frac{1}{7}$–$\frac{1}{6}$ in., callus obtuse shortly bearded; gl. I tip obtuse often irregularly toothed, dorsally 2-nerved or nerveless; II lanceolate, 3-nerved, ciliate, III oblong, ciliate; IV small, narrow, 2-fid, lobes subulate glabrous or ciliate; awn slender, twice as long as the gl. or longer. *Pedicelled spikelets* oblong-lanceolate, acute or obtuse; gl. I glabrous or puberulous, keels hardly ciliate; II ovate, acute, 3-nerved; III oblong, ciliate, 2-nerved.—As in the case of *A. Nardus*, this grass has been so extensively cultivated in India that it is impossible to say where it is wild, and its synonymy is so mixed up with that of *A. Nardus*, and the descriptions of both are so inexact, that until the whole subject of their culture and distribution has been botanically investigated by a skilled observer in various parts of India, their history must remain obscure. Botanically, *A. Schœnanthus* is remarkable for the extraordinary difference between its broad and narrow leaved varieties. Some forms of the narrow leaved closely resemble states of *A. Nardus*, and can only be distinguished from it by the narrow cleft in the centre of gl. I of the sessile spikelet and its corresponding rib in the ventral face of that glume. The figure given by Ventenat (Hort. Cels. t. 89) is unreliable for any grass. I give below Hackel's classification of the varieties with their synonymy, adding one which he does not appear to have seen. I am quite unable to distinguish his vars. *genuinus* and *versicolor*.—"Geranium grass, Rusa oil grass, Oil of Ginger grass." Watt.

Subsp. *genuinus*, Hack. l. c. 609; panicle linear-oblong, secondary branches usually simple, spikes $\frac{1}{3}$–$\frac{3}{4}$ in., dorsal cleft of gl. I hardly reaching the middle of the gl., gl. IV cleft $\frac{1}{3}$–$\frac{1}{2}$ way down, awn perfect, pedicelled spikelets glabrous. *Wall. Cat.* 8794 L.

Var. *Martini*, leaf-base cordate and $\frac{1}{2}$-amplexicaul, spathes and spikelets pale or spikelets reddish. A. Schœnanthus, *Linn. l. c.*; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* iv. (1889) 120. A. Martini, *Roxb. Fl. Ind.* i. 277; *Aitchis. Cat. Panjab. Pl.* 175; *Wight. Cat.* n. 1702. A. giganteus, *Hochst. in Flora* (1844) 242. A. nardoides α, *Nees Fl. Afr. Austr.* 116. A. pachnodes, *Trin. in Mem. Acad. Petersb. Ser.* VI. ii. (1824) 284, *Sp. Gram. Ic.* t. 337. Gymnanthelia Martini, *Anderss. in Schweinf. Beitr. Fl. Æthiop.* 310.

Var. *filiculmis*, Hook. f.; stem 12–16 in., very slender, leaves $\frac{1}{12}$–$\frac{1}{6}$ in. broad, spikes reddish-brown.—Upper Burma, Fort Stedman, *Herb. Hort. Calcutt.*—Probably only a depauperate form.

Var. *versicolor*, Hack. l. c. 610; leaf-base cordate semi-amplexicaul, spathes dull violet and red, spikelets more or less variegated or the pedicelled violet. A. versicolor, *Nees in Wight Cat.* n. 1705; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* iv. (1889) 120, vi. (1891) 65. A. aromaticus, *Sieb. Fl. Maurit.* (*Herb. Exsicc.*) n. 38. A. connatus, *Hochst. in A. Rich. Tent. Fl. Abyss.* ii. 464. A. excavatus, *Hochst. in Flora* (1846) 116. A. foliatus & polyneuros, *Steud. Syn. Gram.* 385, 389. A. nardoides, β, *Nees l. c.* A. pachynodes, β, *Nees Pl. Meyen.* 190. A. pruinosus, *Nees ex Steud. l. c.* 388. A. Schœnanthus, *Wall. Cat.* 8794 C.N., 8795, *Baker Fl. Maurit.* 446; *Trim. Cat. Ceyl. Pl.* 107; ?*Vent. Hort. Cels.* t. 89. A. versicolor, *Nees ex Steud. l. c.*; *Thw. Enum. Pl. Zeyl.* 367. Gymnanthelia connata, *Aschers & Schweinf. in Schweinf. Beitr. Fl. Æthiop.* 310.

Var. *cæsius*, Hack. l. c.; whole plant more or less glaucous, stem slender, leaves very narrow base not dilated, panicle subsimple, gl. I narrowly winged. ?A. bicornis, *Forsk. Fl. Æg. Arab.* 173. A. cæsius, *Nees in Hook. & Arn. Bot. Beech. Voy.* 244, *in Pl. Meyen.* 189; *Wight Cat.* n. 1700, 1700a. A. Martini, *Benth. Fl. Hongk.* 424. A. Iwarancusa, *Boiss. Fl. Orient.* v. 466. Andropogon, *Wall. Cat.* n. 8796.

Var. *gracillimus*, Hook. f.; glaucous, stem very slender, leaves 2–4 by $\frac{1}{8}$ in., panicle simple, joints of rachis of spikes and pedicels nearly glabrous, gl. I of sessile spikelet truncate dorsal channel deep or shallow. Andropogon, *Wall. Cat.* n. 8796 (*Herb. Wight*). Trachypogon cæsius var. α, *Nees in Herb. Wight.*

Subsp. *clandestinus*, Hack. l. c. 612; habit of var. *cæsius*, but gl. I and II of the pedicelled spikelet pubescent. A. clandestinus, *Nees ex Steud. l. c.* 388. Andropogon, *Wall. Cat.* n. 8794 I K.—Burma, *Wallich*; Upper Burma, *Herb. Hort. Calcutt.*

72. **A. Nardus,** *Linn. Sp. Pl.* 1046; stem tall paniculately branched leafy, leaves narrow flat, panicle subsimple to decompound, spikes in densely or loosely compacted sheathed fascicles or subsolitary, joints and pedicels rather slender tips dilated toothed, sessile spikelets $\frac{1}{7}$–$\frac{1}{5}$ in. oblong or lanceolate, gl. I 2-toothed, dorsally flat or with shallow depressions or concave towards the base, margins winged or narrowly margined and scaberulous above the middle.

Throughout the hotter parts of INDIA, BURMA, the MALAY PENINSULA and CEYLON, wild or cultivated.—DISTRIB. Trop. Asia, Africa, Australia.

In its common form it is difficult to distinguish *A. Nardus* from the narrow leaved form of *A. Schœnanthus*, except by the cleft in the gl. I of the sessile spikelet of the latter; and not always very clearly by that. Both are cultivated in India and elsewhere, and *A. Nardus* is (except in foliage never having the broadly cordate leaf-base) quite as variable as its ally. I have been unable satisfactorily to correlate all of the Kew Indian forms with the elaborate classification of varieties established by Hackel. Both his and my conclusions must be regarded as provisional and as certain to be disturbed by a study of additional materials, or by a study of all the forms in their native localities by a specialist who has grasped the history of the species wild and cultivated, over a large area of its distribution. One of Hackel's varieties, *distans*, regarded as a species by Nees, should, I think, be restored to that rank (excluding a Ceylon plant included under it by Hackel); it is exclusively a Himalayan form, not found below 4000 ft., and is very constant in habit and foliage.

The var. *genuinus*, Hack., is founded on an awnless form of the plant, which I believe (with Roxburgh) to be a cultivated state, having seen no awnless specimens in the forms known to be wild. The name is therefore inappropriate botanically, whether or no it represents the first described state of the plant, and better suppressed.

A. NARDUS proper; rootstock stout, stem tall stout leafy, leaves long narrow, panicle large often supra-decompound oblong or subpyramidal more or less interrupted, branches loosely or closely packed erect at length often drooping, spathes laxly or closely imbricate lanceolate, proper spathes $\frac{1}{3}$–$\frac{3}{4}$ in., spikes with 4–5 pairs of spikelets, joints and pedicels rather slender densely or laxly ciliate, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. lanceolate awned, gl. I narrowly winged, awn long or short. A. Nardus, *Bentl & Trim. Medic. Pl.* t. 297; *Trim. Cat. Ceyl. Pl.* 107. A. Nardus, *var.* grandis, *Hack. (in part)*. A. cæsius, *Nees in Wight Cat.* n. 1700c. A. Schœnanthus, *Wall. Cat.* n. 8794 D. E. F. H.—From the Himalaya to Burma and southwd. to Ceylon and Malaya. Mergui, *Griff.* (*Kew Distrib.* 6762). Bengal, *Griff.* (*K. D.* 6760, 6761).

Forma culta; gl. I of sessile spikelet, dorsally flat or deeply hollowed, awn 0 or very short included in the glumes. A. Nardus, *auct. plur.* A. Schœnanthus, *Roxb. Fl. Ind.* i. 274; *Wall. Cat.* n. 8794 E. A. Roxburghii, *Nees in Wight Cat.* n. 1699; *Steud. l. c.* 395. A. Martini, *Thw. Enum. Pl. Zeyl.* 367. A. Nardus, *var.* genuinus, *Hack. Monogr. Androp.* 662 *in part.*

Forma abnormis, spathes empty. A. cæsius, *Nees in Wight Cat.* n. 1700d. Anthistiria, *Wall. l. c.* n. 8768.

Var. *nilagiricus*, Hack. l. c. 604; tall, stem very robust sometimes as thick as the little finger, leaves 2–4 ft. by $\frac{1}{2}$–$\frac{2}{3}$ in. glaucous beneath, ligule coriaceous, panicle 10–12 in. narrow, proper spathes about $\frac{1}{2}$ in. broadly lanceolate cymbiform acuminate, sessile spikelets $\frac{1}{7}$–$\frac{1}{5}$ in. dorsally flat smooth or with shallow depressions hardy winged nerves obscure, lobes of gl. IV subulate, awn short or long. A. nilagiricus, *Hochst. in Hohen. Pl. Ind. Or.* (1851) n. 932. A. confertiflorus, *Steud. l. c.* 385. A. Nardus, var. glomeratus, *Hack. l. c.* A. Schœnanthus, *Wall. Cat.* 8794 B *in part.* Nilghiri Hills, *Wight* (*Herb.* n. 3087) &c.; Conoor, alt. 6000 ft. *Gamble.* Ceylon.—The spathes are normally broader than in *Nardus* proper.

Var. *luridus*, Hook. f.; stem 5–6 ft., leaves long, panicle elongate rather broad decompound branches or narrow with sparingly divided branches, spikes in large rounded crowded fascicles drying of a very dark purplish brown, spathes cymbiform, outer $\frac{1}{2}$–$\frac{1}{4}$ in., proper $\frac{1}{5}$–$\frac{1}{2}$ in. shorter than the purplish black shortly pedunculed spikes, pedicels and joints slender sparsely ciliate with long spreading hairs, sessile spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. lanceolate, gl. I dorsally flat or concave especially below, keels winged above the middle, lobes of gl. IV long ciliate.—Nilghiri Hills, *Schmid.* Ceylon, *Gardner*, *Maxwell.*—Thwaites, *A. distans* may be this or *A. nilagiricus.*

Var. *khasianus*, Hack. l. c. (*in part*); tall, leaves 2–3 ft., panicle elongate 1–3 ft. narrow, branches short compound or decompound, spathes narrowly lanceolate outer $\frac{3}{4}$–$1\frac{1}{4}$ in., proper $\frac{1}{2}$–$\frac{3}{4}$ in., spikes $\frac{1}{2}$–$\frac{2}{3}$ in., joints and pedicels slender shortly villous, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. oblong-lanceolate obtuse, gl. I dorsally flat or with very shallow depressions, very rarely channelled down the centre (as in *A. Schœnanthus*) keels broadly winged above the middle, nerves 2–5 between the keels usually well marked from the middle or above it to near the top, IV rather broadly linear lobes long ciliate. A khasianus, *Munro mss.*—Khasia Hills, alt. 3–5000 ft., *Griffith* (*Kew distrib.* 6759, 6764, 6765); Munnepore, alt. 3500 ft., *Clarke.*—*Wall. Cat.* n. 8794 H. referred here by Hackel has no nerves or wings to gl. I of the sessile spikelets and is, I think, a form of *normalis.*

Var. *grandis*, Hack. l. c. 605 (*in part*); tall, stout, leaves 2–3 ft. by $\frac{1}{3}$–$\frac{1}{2}$ in., panicle narrow loosely branched, branches distant often drooping, outer spathes $1\frac{1}{2}$ 3 in., proper spathes 1–$1\frac{1}{4}$ in., joints and pedicels shortly ciliate, sessile spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. oblong-lanceolate obtuse dorsally flat or slightly concave below keels margined or winged above the middle nerves obscure, keel of II sometimes shortly winged above the middle, lobes of gl. IV ciliate, awn $\frac{1}{3}$–$\frac{1}{2}$ in. A. Schœnanthus, *Wall. Pl. As. Rar.* iii. t. 280, *Cat.* n. 8794 (*in part*). ?A. pendulus, *Nees ex Steud. l. c.* 388. —Nepal, *Wallich.* Sikkim, Terai and hot valleys, *J. D. H.*, &c. Bengal, *Griffith* (*Kew distrib.* n. 6773). Rajmahal, *Herb. Hort. Calcutt.*—The very long outer spathes are seen in no other variety, but they are found shortening in some specimens to the ordinary length of *khasianus* and others.

Var. *coloratus*; stem subsimple, leaves chiefly radical $\frac{1}{12}$–$\frac{1}{6}$ in. broad glaucous

beneath, branches of panicle few, spathes and spikes densely fascicled red-brown when dry, proper spathes about ¾ in. very narrow, sessile spikelets as in *A. Nardus* proper, of which this is a small state with highly coloured spathes. A. coloratus, *Nees ex Wight Cat.* n. 1703. *Wall. Cat.* n. 8794 B (*in part*).—S. India, *Heyne, Wight.*

Var. *flexuosus*, Hack. l. c. 603; stem slender, panicle decompound, branches very slender flexuous almost zigzag, proper spathes about ½ in. narrow divergent, spikes very short with 2–4 pairs of spikelets, joints and peduncles slender laxly ciliate with spreading hairs, sessile spikelets ⅛–⅙ in. lanceolate, gl. I acuminate 2-cuspidate dorsally flat nerveless keels margined scabrid, gl. IV ciliate, awn short. A. flexuosus, *Nees ex Wight Cat.* n. 1704; *Steud. l. c.* 388.—Southern India, *Heyne, Wight.*

Var. *microstachys*, Hook. f.; tall, very slender, leaves narrow, panicle very long slender erect bearing few distant solitary or subsolitary erect filiform branches with one or few very small deflexed spikes, sheaths very narrow tubular erect ½–⅔ in., spikes ⅙–¼ in., joints 2–3, pedicels rather stout shortly ciliate, spikelets ⅛–⅙ in. ovate-oblong or -lanceolate, gl. I dorsally flat or concave below the middle, keels margined or winged nerves obscure or 0, IV very narrow lobes ciliate.—Forests of Oudh, *Thompson.* Garo Hills, *Mann.*—A very distinct-looking plant, from the long erect lower branches and narrow sheaths of the very long slender panicle, short spikes and small spikelets. In the Oudh specimen gl. I is rather broadly winged, and awn short; in the Garo one gl. I is scarcely margined and the awn ⅓ in. long. In some respects it approaches 74, *A. microtheca.*

Var. *exsertus*, Hack. l. c. 608; stem not tall slender, leaves very long and narrow, panicle elongate very narrow, branches short distant, spikes few subsolitary long-peduncled, proper spathes about 1 in., spikes ½–1 in., joints 5–6 and pedicels rather slender shortly villous, sessile spikelets ⅕ in. ovate or oblong 2-toothed dorsally flat or slightly concave 1–2-nerved keels margined or shortly winged, IV eciliate awned. A. Schœnanthus, *Wall. Cat.* n. 8794 M.—Hort. Bot. Calc., *Wallich.* Bengal, *Griffith* (*Kew distrib.* n. 6763, *probably Hort. Calc.*).—Probably a form of *A. Nardus* altered by culture.

Var. *Stracheyi*, Hook. f.; tall, slender, leaves long narrow, panicle strict erect very narrow lax-fld., branches short with few spikes, proper spathes about ¾ in. cymbiform, spikes ½–1 in. brown, joints 6–8 and pedicels subclavate shortly ciliate, spikelets ⅙–¼ in. lanceolate or linear-lanceolate, gl. I bicuspidate, dorsally flat or more or less hollowed nerveless keels hardly margined, IV broad lobes elongate strongly ciliate, awn ½ in. A. Martini, *Herb. Strach. & Winterb.* n. 2.—Kumaon, at Kalenath, alt. 6000 ft., *Str. & W.* Kunawur, Pangi, *Stolizka.*

73. **A. distans,** *Nees ex Steud. Syn. Gram.* 387; rootstock 0, roots fibrous, stem 1–2 ft., leaves almost filiform flexuous, proper spathes ⅔–1 in., spikes 1–1½ in. solitary or few together scattered forming a subsimple panicle, joints and pedicels narrowly clavate silkily ciliate, sessile spikelets ⅕–⅓ in. narrowly lanceolate dorsally flat 5–7-nerved between the narrowly winged keels, keels of II winged above the middle, lobes of IV ciliate. *Duthie Grass. N.W. Ind.* 19. A. Nardus *var.* distans, *Hack. Monogr. Androp.* 608.

Temperate Himalaya, alt. 4–7000 ft. (to 9000 ft. in Garwhal, *Duthie*), from Kashmir to Kumaon, *Royle*, &c.

A very distinct odoriferous form or species, confined to elevations above 4000 ft. on the Himalaya, conspicuous for its almost simple (not paniculately branched) stems, leaves very narrow and tufted at their bases, distant large pale or reddish long deflexed spikes and very narrow long spikelets with strong nerves on gl. I of the sessile, tips of gl. I of the sessile spikelets more or less, sometimes deeply 2-cuspidate, margins of gl. II pubescent, IV broader than in *A. Nardus* pro-

per with long subulate-lanceolate ciliate lobes.—Specimens collected by Falconer and by Duthie, at 8900 ft. in Garwhal, have filiform flexuous or tortuous leaves. The Ceylon *A. distans*, Thwaites, from Newera Elia, is a much longer leaved plant, has very dark spikes and is a dwarf starved state of *A. nilagirica*, I suspect. Lisboa (Journ. Bomb. Nat. Hist. Soc. vi. (1891) cites *A. distans* as a native of *N. Canara*, but I have no means of confirming the identification.

74. **A. microtheca,** *Hook. f.*; tall, panicle elongate narrow decompound, branches very slender erect elongate, spikes $\frac{1}{6}$–$\frac{1}{4}$ in. solitary rarely fascicled shortly peduncled deflexed, proper spathes $\frac{1}{2}$ in. narrowly lanceolate divaricate, spikes very short, joints few and pedicels clavate or bucciniform mouth toothed margins very shortly ciliate, sessile spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I ovate-lanceolate or lanceolate dorsally deeply concave with thickened margins, pubescent in the hollow.

East Nepal; hot valleys, alt. 3–4000 ft., *J. D. H.*

Stem 3–4 ft., slender. *Leaves* long, narrow. *Panicle* leafy below; leaves on the flowering branches short, erect, strict, appressed to the branches, bearing in their axils the very small peduncled proper spathes which project horizontally; peduncle of spikes about half the length of the proper spathe and wholly concealed in it, the very small few-fld. spikes alone being exserted; proper spathes $\frac{1}{3}$–$\frac{2}{3}$ in., narrowly lanceolate, acuminate, strict, glabrous. *Gl.* I *of sessile spikelets* variable in breadth, rarely flat dorsally, keels scaberulous above the middle, tip minutely 2-cuspidate; II acute, keel scaberulous below the tip; III ovate-oblong, acute, 2-nerved, ciliate; IV narrow, 2 fid, lobes subulate eciliate, awn $\frac{1}{4}$ in.; palea minute, oblong or orbicular. *Pedicelled spikelets* (sometimes fem.), ovate-oblong, subacute, gl. I 7-nerved, keels scaberulous; II acuminate, 3-nerved; III oblong, obtuse; IV linear, tip 2-fid, 1-nerved nerve excurrent; palea minute, ovate.—The long slender branches of the panicle, with rather distinct spikes, and divergent proper spathes, short stout pedicels and joints, and minute spikelets (the smallest of the Indian *Cymbopogons*) characterize this species. Its nearest ally is *N. Nardus* var. *microstachys*. Munro had given the mss. name of *Hookeri* to it; but it is not his *A. Hookeri* of Bhotan, nor that described by Hackel. The pedicelled spikelets described above are abnormal in being female.

75. **A. Gidarba,** *Ham. ex Wall. Cat.* n. 8797; stem slender subsimple, leaves narrow, panicle narrow elongate, branches rather distant short, joints and pedicels clavate, sessile spikelets $\frac{1}{8}$–$\frac{1}{5}$ in., gl. I linear-lanceolate 2-toothed dorsally deeply concave below the middle with a boss at the base of the cavity, keels scaberulous neither winged nor margined. *Steud. Syn. Gram.* 387; *Hack Monogr. Androp.* 613; *Duthie Grass. N.W. Ind.* 20.—Andropogon, *Wall. Cat.* n 8797, 8798 D.

Western Himalaya, *Falconer*, &c.; Simla, alt. 7–8000 ft., *Duthie.* Behar, at Monghir, *Hamilton*; Gya, *Herb. Calcutt.*

Stem 4–6 ft., erect. *Leaves* 1–2 ft., finely acuminate, glabrous on both surfaces or puberulous above, midrib slender, margins smooth ciliate towards the base; sheath terete, glabrous; ligule short, truncate. *Panicle* very slender, branches simple or the lower divided; proper spathes $\frac{3}{4}$–1 in., narrowly lanceolate, about twice as long as the peduncle. *Spikes* $\frac{1}{2}$–1 in., strict, at length deflexed; joints and pedicels shortly villous. *Sessile spikelets* pale or dark green, with sometimes a dorsal circular pit above the middle, margins raised; II cymbiform, acute, 1-nerved; III lanceolate, 2-nerved; IV narrow, 2-cleft, lobes subulate ciliate; awn $\frac{1}{4}$–$\frac{1}{2}$ in., capillary. *Pedicelled spikelets* rather longer than the sessile, lanceolate, acute, glabrous.—Odour described as terebinthine.

§§ *Leaf-sheaths compressed, keeled.*

76. **A. Hookeri,** *Munro ex Hack. Monogr. Androp.* 614; tall, slender, leaves long linear, panicle linear interrupted, branches suberect nearly simple, proper spathes ⅔–1¼ in., joints and pedicels of spikes stout clavate, sessile spikelets ¼ in. dull violet dorsally deeply concave puberulous keels scabrid.

BHOTAN? *Griffith* (*Kew Distrib.* n. 6767 *ex Hack.*).

Leaves 12–16 by $\frac{1}{10}$–$\frac{1}{5}$ in., rather rigid, smooth, margin scabrid, midrib broad keeled below; ligule obtuse, membranous, glabrous. *Panicle* 12–16 in.; primary branches of 1–2 nodes giving off solitary secondary. *Spikes* subequal, joints and pedicels dorsally glabrous, margins sparsely villous, tips 2–3-lobed. *Sessile spikelets*, gl. I coriaceo-chartaceous, acute, minutely 2-toothed, keels not margined or winged obscurely 2-nerved; II lanceolate, acute, keel scabrid, margin eciliate; IV 2-cleft, lobes slender eciliate; awn about ¾ in. *Pedicelled spikelets* equalling the sessile, linear-lanceolate, glabrous.—I have not recognized the above amongst Griffith's plants in the Kew Herbarium. The Bhotan plant bearing the number 6767 in that Herbarium and named by Munro *A. Hookeri*, is not a *Cymbopogon*, but probably a *Schizachyrium*, in too imperfect a state for determination. Munro has also attached the name *A. Hookeri* to my *A. microtheca*, which was appropriate for a plant first found by myself.

** Peduncle of spikes longer than the proper spathe.

77. **A. lividus,** *Thwaites Enum. Pl. Zeyl.* 367; erect, leaves narrow rigid, spikes long-peduncled, pedicels and joints clavate, sessile spikelets ¼ in., gl. I lanceolate obscurely 2-toothed keels with narrow scaberulous wings, II shortly awned with a dorsal serrulate wing above the middle, IV deeply 2-fid segments villously ciliate. *Hack. Monogr. Androp.* 615; *Trim. Cat. Ceyl. Pl.* 107.

NILGHIRI HILLS, *Schmid.* CEYLON; Mountains, alt. 7000 ft., *Thwaites*, (C.P. 953).

Stems 1–2 ft., tufted, strict, smooth, rigid. *Leaves* 4–6 in., strict, erect, acuminate, strongly nerved, nearly smooth; lower sheaths short; ligule oblong. *Peduncles* 1-4, terminal and axillary; spikes 1–2 in., erect, dull reddish-brown; joints and pedicels about half as long as the sessile spikelet, margins ciliate with silky hairs, tips cupped and toothed. *Sessile spikelet*, callus very short; gl. I flat, glabrous, margins broadly incurved below, nerves obscure; II narrow, ciliate, dorsally rounded; III oblong, ciliate, 2-nerved; IV as long as III; awn very slender, about twice as long as the spikelet; palea 0. *Pedicelled spikelets* as long as the sessile, linear-oblong, subacute, dorsally convex, glabrous, many-nerved, keels scaberulous, margins broadly incurved; II ovate-oblong, acuminate, sub 3-nerved, ciliate; III as in the sessile; IV as long, hyaline.—Schmid's Nilghiri specimen was distributed by Dr. Stahl mixed with *A. pertusus*, which it strongly resembles.

B. Column of awn hirsute.

78. **A. filipendulus,** *Hochst. in Flora*, xxix. (1846) 115; *Steud. Syn. Gram.* 389 (filipendulinus). *Hack. Monogr. Androp.* 634; *Trim. Cat. Pl. Ceylon*, 107. A. finitimus, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 465; *Steud. l. c.*; *Hack. l. c.* 637; *Baker Fl. Maurit.* 446. A. Griffithii, *Munro in Cat. Pl. Griffith, Falconer, &c.* 58 (*ined.*). A. lachnatherus, *Benth. Fl. Austral.* vii. 434. A. procerus, *F. Muell. Fragm.* viii. 124 (*non Br.*). Hyparrhenia finitima, *Anderss. in Schweinf. Beitr. Fl. Æthiop.* 310. Anthistiria fasciculata, *Thw. Enum. Pl. Zeyl.* 366.

KHASIA HILLS, *Griffith*, *Clarke*. CEYLON; Badulla district, alt. 3000 ft., *Thwaites*.—DISTRIB. Trop. Asia, Afr., and Austral.

Stems 3–4 ft., erect, leafy, subsimple or branching from the base, nodes glabrous. *Leaves* 2–3 ft. by $\frac{1}{10}$–$\frac{1}{6}$ in., linear, setaceously acuminate, scaberulous or smooth, margins scabrid; sheath terete, smooth, glabrous or mouth hairy; ligule short, membranous. *Panicle* 1–2 ft., narrow, compound, branches slender, nodes glabrous or pubescent. *Spathes* 1–3 in., linear-lanceolate, acuminate, or tips setaceous, glabrous ciliate or hairy. *Peduncle* much shorter than the spathe, bearded above with white hairs. *Spikes* $\frac{1}{2}$–$\frac{2}{3}$ in., one subsessile with one pair of homogamous spikelets, the other $\frac{1}{10}$–$\frac{1}{8}$ in. long with two (rarely 0) homogamous pairs; heterogamous spikelets 1–3 pairs; joints and pedicels very short, linear, ciliate or villous, tips very oblique. *Gl. I of sessile spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in.; callus acute, bearded; gl. I membranous, truncate, 5–7-nerved, glabrous or villous, dorsally slightly channelled or not; II oblong, obtuse, keel glabrous or ciliate, 3-nerved; III linear-oblong, obtuse, hyaline, ciliate; IV shorter, 2-toothed, glabrous; awn 2–2$\frac{1}{2}$ in., column hispid with rufous hairs. *Pedicelled spikelets* linear-lanceolate, gl. I acute, 7–9-nerved, keels setulose; II oblong, keeled; III and IV hyaline or 0.—*Homogamous spikelets* not awned.—Hackel has 4 varieties under *A. filipendulus*, depending chiefly on the relative length of the spathe and peduncle, and the nnmber 1 or 2 of the heterogamous spikelets. Of these γ. *Thwaitesii* is the Ceylon plant, with one pair of heterogamous and two of homogamous on the stipitate spike. *A. finitimus* has normally 2–3 pairs of heterogamous spikelets on each spike.—These and two other African species, *A. Barteri*, Hack., and *A. familiaris*, Steud., are very closely allied, and regarded by Hackel as probably subspecies of *filipendulus*.

DOUBTFUL AND EXCLUDED SPECIES OF *Andropogon*.

A. CITRATUS, *DC. Cat. Hort. Monsp.* 78, *name only*.—May be either *A. Nardus* or *A. Schœnanthus*, ex Hack. Monogr. Androp. 608.

A. CYMBACHNE, *Hack. Monogr. Androp.* 450. Cymbachne ciliaris, *Retz. Obs.* vi. 36. Rottboellia Cymbachne, *Willd. Sp. Pl.* i. 465. ? Arthrostachys gracilis, *Desv. Opusc.* 74, t. 6, f. 2.—Bengal, *Kœnig*.—An obscure plant, described by Hackel from an incomplete specimen in the Copenhagen Herbarium, and referred to the section *Arthrolepis*.

A. CYMBARIUS, *Linn. Mant.* ii. 303; *Hack. l. c.* 629. An African plant, stated by Linnæus to have been found in India by Kœnig.

A. DACTYLOIDES, *Steud. ex Duthie Grass. N. W. Ind.* 19. ? Lepeocercis digitata, *Nees*.—Doab, and banks of the Jumna, *Royle*.—*A. dactyloides*, Steud., is *Trachypogon polymorphus*, Hack., not an Indian plant, and *Lepeocercis digitata*, Nees ex Royle, is a name only, not taken up by Hackel.

A. DEPAUPERATUS, *Kunth Revis. Gram.* i. 166, *Enum. Pl.* i. 509; *Hack. l. c.* 565. Pollinia depauperata, *Spreng. Pugill.* ii. 11, *Syst. Veg.* i. 289.—Bengal.—An indeterminable species of subgen. *Chrysopogon*.

A. DIVERSIFLORUS, *Steud. in Zoll. Syst. Verz.* 58, is *Polytrias præmorsa*, Hack. (Androp. 189), a Javanese plant not hitherto found in British India.

A. FLABELLIFORMIS, *Roxb. ex Spreng. Pugill.* ii. 9, *Syst. Veg.* i. 283; *Kunth l. c.* 509; *Hack. l. c.* 651.—Bengal.—Is indeterminable.

A. FULVUS, *Spreng. Pugill.* ii. 8, *Syst. l. c.* 287; *Kunth l. c.* 503; *Hack. l. c.* 565.—Bengal.—Is undeterminable.

54. **ANTHISTIRIA**, *Linn.*

THEMEDA, *Forsk.*

Tall, annual or perennial grasses. *Leaves* long, narrow. *Spikes* many, short, crowded in spathaceous panicled fascicles, each in a proper spathe, very shortly peduncled, inarticulate at the base. *Spikelets* 6–11; 4 lowest

male or neuter, involucriform, awnless, in superposed pairs or whorled round a jointed rachis which bears one or more sessile bisexual or fem. usually awned spikelets, each with one or if more than one then the uppermost with pedicelled male or neuter awnless spikelets inserted on its callus. *Bisexual* (*or fem.*) *spikelets* linear-oblong; callus long or short; gl. I terete, or dorsally compressed or channelled, coriaceous, at length hardened, margins incurved not keeled; II as long, coriaceous, 3-nerved, keeled, keel broad, margins thin incurved; III oblong, hyaline, 1-nerved; IV the very slender sometimes narrowly hyaline base of an awn, rarely awnless; palea 0. *Lodicules* cuneate. *Stamens* 3. *Styles* free, and stigmas long. *Grain* oblong. *Pedicelled spikelets* lanceolate, dorsally compressed; pedicels slender, compressed; gls. 1–3, I many-nerved, margins inflexed, keels often winged; II as long as I, 1–3-nerved, hyaline, or 0; III smaller or 0.—Species about 10; warm regions of the Old World.

The species of this genus are most difficult of discrimination, of which the best proof is the irreconcilable conclusions of two excellent botanists, both experts in the Order of *Gramineæ*, Andersson (*in Nov. Act. Upsal.* III. ii. (1856), and Hackel (*Monogr. Androp.*).

Hackel has restored Forskahl's name of *Themeda* because of its having four years of priority, and of Linnæus' description of *Anthistiria* being very inaccurate. The claim of priority is obvious, but if that of inaccurate description is admitted, it should invalidate the recognition of a host of the genera of old authors. Against both claims stands the fact, that *Anthistiria* had for upwards of a century been adopted by all botanical writers.

* Involucrant spikelets inserted on a level, all sessile; glumes 3, solitary in *A. arguens*.

1. **A. arguens,** *Willd. Sp. Pl.* iv. 901; annual, spikes in lax nodding heads, outer spathes 3–5 in. very narrow base hirsute, proper spathes ½–1 in., involucr. spikelets 2–4 ¼–⅓ in. unequal, glume solitary. *Kunth Enum. Pl.* i. 482; *Steud. Syn. Gram.* 401. A. frondosa, *Br. Prodr.* 200; *Benth. Fl. Austral.* vii. 542. A. arundinacea, *Hassk. in Tijdschr. Nat. Gesch.* x. 115 (*non Roxb.*). A. ciliata var. Junghuhniana, *Büse ex Miq. Fl. Ind. Bat.* iii. 504. A. pilifera, *Steud. in Zoll. Syst. Verz.* 58, *Syn. Pl. Gram.* 400. A. Junghuhniana, *Nees in Jung. Jav. ex Anderss. in Nov. Act. Upsal. Ser.* III. ii. 233. Aristaria barbata, *Jungh. in Tijdschr. Nat. Gesch.* vii. 296. Themeda arguens, *Hack. Monogr. Androp.* 657. Stipa arguens, *Linn. Sp. Pl. Ed.* II. 117.

MALACCA, *Griffith.* ANDAMAN ISLDS., *Prain.*—DISTRIB. Malaya, Australia.

Stems tall or short, sometimes 10 ft. high, stout or slender. *Leaves* 10–16 by ¼ in. or narrower, and sheaths glabrous or sparsely hairy; ligule rounded. *Heads* of spikes flabelliform, long-peduncled; spikes with often imperfect scattered linear hyaline spikelets on the peduncle. *Involucr. spikelets* very irregular, often only 2, linear-lanceolate, hyaline, 5–6-nerved. *Bisexual spikelets* ¼–⅓ in., solitary, cylindric, with a long pungent dorsally brown-bearded callus, brown when ripe, obscurely nerved, smooth and dotted below, scabrid and hispid towards the tip. *Awn* very stout, often 3 in. long, dark brown.—The Malaccan specimens are small (1–2 ft.), and weaker than the insular.

2. **A. imberbis,** *Retz. Obs.* iii. 11; perennial, spikes in globose or fan-shaped fascicles, spathes glabrous or sparsely hairy, outer 1–2 in., proper about ½ in., involucr. spikelets ⅓–½ in. glabrous or ciliate with tubercle-based hairs gls. 3, bisexual spikelets solitary ¼–⅓ in. with 2 pedicelled

scabrid towards the tip only, callus long pungent. *Kunth. Enum. Pl.* i. 481; *Steud. Syn. Gram.* 401. A. Forskahlii, *Kunth Revis. Gram.* i. 162, *Enum. l. c.* 483; *Steud. l. c.* 402. A. vulgaris, *Hack. in Engl. & Prantl. Natürl. Planzenf.* ii. II. 29. Themeda triandra, *Forsk. Fl. Ægypt. Arab.* 178. T. polygama, *Gmel. Syst.* 149. T. Forskahlii, *Hack. Monogr. Androp.* 659; *Duthie Fodd. Grass. N. Ind.* 43.—Anthistiria, *Wall. Cat.* n. 8764, A. C. E. F.

Hotter drier parts of INDIA, from Upper Bengal to Travancore, ascending the Himalaya to 3–4000 ft. (Var. *Roylei* to 10,000 ft.). BURMA. CEYLON, ascending to 4000 ft.—DISTRIB. Warm regions of the Old World.

Stem 1–6 ft., stout or slender, subsimple or branched. *Leaves* 3–10 in., linear, rather rigid, glabrous or sparsely hairy, green or subglaucous beneath; ligule short, ciliolate. *Head* of fascicles of spikes few or many, long- or short-peduncled; spathes glabrous or ciliate with usually very small tubercle-based hairs; proper spathes longer than the spikes, cymbiform, tips acute or subacute. *Involucr. spikelets* $\frac{1}{3}$ in., oblong-lanceolate, acute or acuminate, red brown, dorsally hispidly ciliate or glabrous, glumes 3. *Bisexual spikelets* cylindric, obtuse, with long brown hairs; gl. I terete, dorsally rounded, ripe polished dark brown, hispidulous towards the tip only; awn $\frac{1}{2}$–2 in. long, base capillary. *Pedicelled spikelets* very narrow, glabrous or ciliate with a few tubercled-based hairs, keels ciliolate.—A very variable grass, some states of which are with difficulty distinguishable from *A. ciliata.* The earliest names of this plant are *Themeda triandra,* Forsk., and *Anthistiria imberbis,* Retz. Hackel has abandoned both, substituting first *Anthistiria vulgaris,* and then *Themeda Forskahlii,* on the ground that *A. imberbis* was perhaps not Forskahl's *T. triandra* (why then call it *Forskahlii* ?) of which no type specimen exists, and because *triandra* indicates a character of no individual value in grasses. In so doing he overlooked Gmelin's * name of *T. polygama* (Syst. 149). Having regard to the wide range of *A. imberbis,* from Australia to Africa, its presence in Arabia might well be anticipated; and that it is a native of that country is now proved by Schweinfurth's finding Hackel's var. *glauca* in that country. This makes the var. (which is local, and not Indian) the type of the species, and, if Forskahl's name of *Themeda* is to be retained, necessitates a rearrangement of the varieties. To me it appears most expedient to retain Retz's name which applies to the prevalent form over the area of distribution as the specific one.

The following is Hackel's arrangement of the Indian forms which may be variously reduced or added to. It has the great merit of systematizing the authorities fairly well. Of these I have kept up var. *laxa* as a species, following Andersson, though not without doubts. Of others, as *A. polystachya,* I am doubtful, judging from Roxburgh's description and its being an annual, I suspect it may be a state of *ciliata.* Andersson included it under *A. arguens,* which it certainly is not.

* *Stem* 1–3 ft. *Leaves* 2–8 by $\frac{1}{10}$–$\frac{1}{5}$ in. *Panicle* 6–12 in., nodes 2–3, lower branches simple below. Gl. I of *invol. spikelets* not winged or narrowly on one side only.

Var. *vulgaris,* Hack. l. c. 660; spikelets with many tubercle-based hairs. A. ciliata, *Retz. l. c.* (*non Linn. f.*); *Lamk. Ill.* t. 841, f. 2; *Cav. Ic.* t. 459; *Roxb. Fl. Ind.* i. 247; *Wight. Cat.* n. 1708; *Anderss. in Nov. Act. Sc. Upsal.* ii. (1856), *in Walp. Ann.* vi. 1057; *Grah. Cat. Bomb. Pl.* 239; *Dalz. & Gibs. Bomb. Fl.* 304; *Thw. Enum. Pl. Zeyl.* 366 (*excl. var.* major); *Trim. Cat. Ceyl. Pl.* 108; *Benth. Fl. Austral.* vii. 542. ? A. polystachya, *Roxb. l. c.* 248; *Kunth Enum. Pl.* i. 481; *Steud. l. c.*

Var. *imberbis,* Hack. l. c. 661; invol. spikelets glabrous or very sparingly hairy. A. ciliata var. imberbis, *Nees in Linnæa* vii. (1832) 284. A. ciliata var.

* Gmelin has, by oversight probably, assumed the first word of Forskahl's brief diagnosis to be his specific name.

major, *Thw. l. c.* 366. A. ciliata? *Munro in Herb. Griff.* (*Kew distrib.* n. 6808). *A.* australis, *Br. Prodr.* 200; *Kunth l. c.*; *Steud. l. c.*; *Anderss. l. c.* 13; *Walp. l. c.* 1058. A. arguens, *Wight Cat.* n. 1709. A. imberbis, *Retz. Obs.* iii. 11; *Kunth l. c.* 481 (*excl. Syn.*).—Anthistiria, *Wall. Cat.* 8764, A. E. F.

** *Stems* 3–5 ft. *Leaves* 8–16 by $\frac{1}{5}$–$\frac{1}{3}$ in. *Panicle* 16–24 in.; nodes 5–6; lower branches usually compound. Gl. I of *invol. spikelets* with often broad scarious margins.

Var. *major*, Hack. l. c. 662; proper spathes and invol. spikelets hirsute with green or white tubercle-based hairs. A. ciliata, *Thunb. Fl. Jap.* 40; *Wight Cat.* n. 1708. ?A. puberula, *Anderss. l. c.* 12; *Walp. l. c.* 1038 (see Var. *Roylei*).

*** Annual? *Stem* very slender, unbranched; leaves very narrow.

Var. *Roylei*, Hook. f.; spikes few in peduncled axillary fascicles, spathes glabrous outermost 2–3 in. proper rather longer than the spikes, invol. spikelets $\frac{1}{3}$ in. naked or with a few cilia, bisexual $\frac{1}{4}$–$\frac{1}{3}$ in. hispid towards the tip, pedicelled longer glabrous, keels not ciliate. ?A. puberula, *Anderss. l. c.* 12; *Walp. l. c.* 1058. A. ciliata, β, *Nees in Herb. Royle.*—N. W. Himalaya, *Royle*; Simla Hills, *Thomson.* Kumaon, alt. 7500 ft., Strach. & Winterb. (*A. ciliata*).—A very distinct form, and the only temperate one of *A. imberbis.* It closely resembles *A. Hookeri*, the only other temp. Himalayan species, which has superposed pairs of much larger invol. spikelets, solitary spikes and short spathes. The glabrous spikelets and larger sessile spikelets hispid at the top distinguish it from *ciliata.*

3. **A. laxa,** *Anderss. in Nov. Act. Sc. Upsal. Ser.* III. ii. (1856) 243; perennial, stem tall stout leafy proliferously branched, panicles of spikes small of few spikelets in a long lax subsimple leafy panicle shortly peduncled, outer spathes $\frac{1}{2}$–1 in., proper spathes nearly glabrous hardly longer than the spikes, involuc. spikelets $\frac{1}{7}$–$\frac{1}{6}$ in. nearly glabrous gls. 3, bisexual spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. solitary with 2 pedicelled, callus short, pedicelled spikelets glabrous or nearly so, awn 1–1$\frac{1}{2}$ in. *Walp. Ann.* vi. 1059. Themeda Forskahlii, *var.*? laxa, *Hack. Monogr. Androp.* 663.—Anthistiria, *Wall. Cat.* n. 8775.

NEPAL, *Wallich.* BHOTAN, *Griffith.* CENTRAL PROVINCES; Khandwa, *Duthie.* Intermediate between *A. imberbis* and *ciliata*, with very stout erect polished stems 2–3 ft. high, as thick as a goose-quill, and very small nearly glabrous heads of spikes. The panicle is leafy and all the leaves are very narrow. There is a specimen in the Kew Herbarium from Roxburgh, but without habitat. It may prove to be a form of *A. imberbis*, with small spikelets, or of *strigosa*, with unarmed spathes and spikelets.

4. **A. ciliata,** *Linn. f. Nov. Gram. Gen.* 35: annual, spikes in globose or fan-shaped fascicles, outer spathes 1–3 in. glabrous or sparingly ciliate, proper spathes and spikelets usually copiously clothed with tubercle-based bristles, invol. spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. gls. 3, bisexual spikelets $\frac{1}{5}$–$\frac{1}{5}$ in. usually solitary with 1 or 2 pedicelled spikelets scabrid, callus short obtuse, awn 1–1$\frac{1}{2}$ in. *Gærtn. Carp.* ii. 465, t. 175; *Lamk. Illustr.* t. 841, f. 1; *Beauv. Agrost.* t. 23, f. 7; *Steud. Syn. Gram.* 401; *Duthie Grass. N.W. Ind.* 42; *Baker Fl. Maurit.* 448. A. barbata, *Desf. in Journ. Phys.* xl. 294, t. 2. A. scandens, *Roxb. Fl. Ind.* i. 248. A. semiberbis, *Nees Fl. Afr. Austr.* 125. Themeda ciliata, *Hack. Monogr. Androp.* 664. Andropogon nutans, *Linn. Mant.* ii. 303. A. quadrivalva (*err. typog.*) *Linn. Syst. Veg. Ed.* xiii. 758.—Anthistiria, *Wall. Cat.* n. 8764 B. D.

N.W. INDIA, *Royle*, Kumaon, ascending to 7500 ft., Nepal, *Wallich.* BENGAL, *Roxburgh.* BEHAR, *J. D. H.* The CONCAN, CENTRAL PROVINCES, MALABAR and TENASSERIM.—DISTRIB. Mascarene Islds.

In habit and size *A. ciliata* often resembles the ordinary states of *A. imberbis* and it

varies quite as much as that species does. The diagnoses given above serve to distinguish them, especially the small size of the spikelets of *A. ciliata*, its annual habit and the large size of the tubercles on which the far more copious rigid bristles are inserted. Roxburgh describes it as perennial and scandent, with stems many feet long, rooting at the nodes, but Hackel has pointed out that Roxburgh's description is that of an annual; and as I have seen it growing in Bengal, it is rather a scrambler amongst bushes than scandent in a strict sense. The stems are also often erect with a geniculate base.

Var. *Helferi*; dwarf, spikes in more compact globose heads. A. Helferi, *Munro mss.* Themeda Helferi, *Hack. l. c.* 665.—Tenasserim, *Helfer.*—I think this is only a dwarf variety of *A. ciliata*, specimens of which accompany it in Helfer's herbarium.

5. **A. strigosa,** *Ham. mss.*; perennial, stem tall rather stout, spikes in small dense shortly peduncled heads arranged in a long very narrow panicle with filiform leaves, spathes very short glabrous, invol. spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. gls. 3 dorsally clothed with very rigid tubercle-based bristles, bisexual spikelets 1–2 $\frac{1}{7}$–$\frac{1}{6}$ in. hispidulous towards the tip, callus short obtuse, awn very short capillary.—Anthistiria, *Wall. Cat.* n. 8766.

Lower Assam, *Hamilton.* Behar; Monghyr, *Herb. Calcutt.*

Stem 3–4 ft., erect, as thick as a small goose-quill, polished. *Leaves* 1 ft. by $\frac{1}{8}$–$\frac{1}{6}$ in., smooth, tips filiferous; sheaths polished, terete, keeled; ligule a narrow ciliolate membrane. *Panicle* 1–2 ft., with one or two lower long axillary branches; leaves of panicle 6–10 in., flexuous; fascicles of spikes triangular, about $\frac{1}{3}$ in. broad, outer spathes hardly longer than the fascicles cymbiform with very slender tips, glabrous. *Invol. spikelets* gl. I margins narrowly winged; II as long, acuminate, 3-nerved; III lanceolate, hyaline, 1-nerved. *Bisexual spikelets* terete; callus bearded with white hairs; gl. II coriaceous, notched, awned; III shorter, hyaline, 1-nerved; IV the very narrow bifid hyaline margin of an excessively slender awn $\frac{1}{4}$ in. long; palea minute. Gl. I of *pedicelled spikelets* lanceolate, keels with long stiff tubercle-based hairs.—The long panicle and very small heads with short spathes, and the strongly armed gls. of the invol. and pedicelled spikelets distinguish this from *A. imberbis*, and ally it to *ciliaris* with which it agrees in the size and armature of the spikelets.

** Involucrant spikelets in superposed pairs, glumes 3 or 4.

† *Callus of bisexual spikelets short, obtuse.*

6. **A. tremula,** *Nees ex Steud. Syn. Gram.* 401; tall, slender, panicle sparingly branched, spikes in subflabelliform fascicles $\frac{1}{2}$–1 in. broad, outer spathes $\frac{1}{2}$–1 in., invol. spikelets softly hairy, bisexual spikelets 1 or 2 hispidulous deeply dorsally channelled, awn $\frac{1}{2}$–$\frac{3}{4}$ in. *Thw. Enum. Pl. Zeyl.* 366; *Trim. Cat. Ceyl. Pl.* 108. A. arguens, *Heyne ex Wall. Cat.* n. 8765. Androscepia tremula, *Anderss. in Nov. Act. Upsal. Ser.* III. ii. (1856) 247. Themeda tremula, *Hack. Monogr. Androp.* 667.—Anthistiria, *Wall. Cat. l. c.*

The Deccan Peninsula; from the Concan and Central Provinces southwd. Ceylon, *Walker, Thwaites* (C.P. 961 *in part*).

Perennial? *Stem* tufted, 1–3 ft., rarely thicker than a crow-quill. *Leaves* 6–12 in., finely acuminate, nearly smooth, margins scaberulous, upper often exceeding the panicle; ligule a narrow membrane. *Panicle* 1–2 ft., subsimple, of many usually distant compound fascicles of spathes and spikes on flexuous capillary peduncles $\frac{1}{2}$–1 in. long; lower branches sometimes elongate and again panicled; fascicles red brown when dry, the larger sometimes semiglobose; outer spathes usually hardly longer than the fascicles, proper spathes not twice as long as the spikes, sides and keel ciliate.

Invol. spikelets ¼ in.; gls. 3, ovate-lanceolate, acuminate, margins with narrow scarious wings, dorsally copiously ciliate with tubercle-based hairs; II as long, lanceolate, acuminate, membranous, 3-nerved; III as long, hyaline, lanceolate, acuminate, 2-nerved. *Bisexual spikelets* ⅙ in., usually 2, lower with one pedicelled spikelet, upper with two; callus hairs rusty. *Pedicelled spikelets* lanceolate, gls. 3; I lanceolate, dorsally ciliate with long hairs and one margin winged; II and III as in the involucrant spikelets.

7. **A. Thwaitesii,** *Hook. f.*; tall, very stout, nodes glaucous, panicle leafy, spikes in dense subflabelliform fascicles 1–1½ in. broad, outer spathes 1–2½ in., bisexual spikelets 2 hispidulous dorsally channelled, awn 1 in.

CEYLON, *Thwaites* (C.P. 961 *in part*).

Perennial? *Stem* probably 5–6 ft., thicker than a goose-quill, polished. *Leaves* 1–2 ft. by ¼–⅔ in., finely acuminate, tips setaceous; ligule a ciliolate narrow membrane. *Panicle* 12 in. or more; rachis stout, leafy; leaves 6–10 in. long. *Fascicles* of spikes as in *A. tremula*, but larger and less hairy.

8. **A. Cymbaria,** *Roxb. Fl. Ind.* i. 251 (*excl. Syn.*); tall, stout, panicle supradecompound thyrsiform, spikes innumerable glabrous densely crowded in small long peduncled narrow fascicles ¼–½ in. long, proper spathes ½–⅔ in. linear-lanceolate, invol. spikelets ⅛–⅙ in. acuminate glabrous gls. 4, bisexual spikelets solitary (rarely 2) awned, callus hairs white soft = ½ the spikelet. *Kunth Enum. Pl.* i. 482, *excl. Syn., Suppl.* 396; *Steud. Syn. Gram.* 399; *Grah. Cat. Bomb. Pl.* 219; *Dalz. & Gibs. Bomb. Fl.* 304; *Thw. Enum. Pl. Zeyl.* 436; *Trim. Cat. Ceyl. Pl.* 108. Andropogon serratifolius, *Herb. Heyne ex Wall. Cat.* n. 8771 B. Themeda Cymbaria, *Hack. Monogr. Androp.* 668.—Anthistiria, *Wall. Cat.* n. 8771.

NILGHIRI HILLS, *Wight, Schmid.* MYSORE or the CARNATIC, *Herb. G. Thomson.* CEYLON; Matelle East, *Thwaites* (C.P. 3257, 3803).

Perennial. *Stem* 3–8 ft., as thick as a swan's quill below, puberulous beneath the nodes. *Leaves* 2–4 ft. by ⅙–¼ in., not overtopping the panicle, scaberulous above, glaucous beneath, margins scabrid; sheaths subcompressed, keeled; ligule very short. *Panicle* tall, 1–2 ft., branches smooth or scaberulous; spikes in oblong fascicles ½–⅓ in. long. *Invol. spikelets*, red or blueish, keels scabrid. *Bisexual spikelets* linear-oblong; gl. I shining below, scaberulous above; awn ¼–¾ in., slender.

9. **A. anathera,** *Nees ex Royle Ill. Bot. Himal.* 417 (*name*); upper leaves erect exceeding the elongate subsimple panicle, spikes few in pedicelled fascicles, involucr. spikelets ⅕–⅓ in., glumes 4, keels of gl. I with tubercle-based hairs, bisexual spikelets 2–3 linear-lanceolate not awned, keels of gl. I ciliolate. *Steud. Syn. Gram.* 402; *Aitch. Cat. Panjab Pl.* 173; *Duthie Grass. N.W. Ind.* 23, *Fodd. Grass. N. Ind.* 42; *Boiss. Fl. Orient.* v. 460. Androscepia anathera, *Anderss. in Nov. Act. Sc. Upsal. Ser.* III. ii. (1856) 249. Themeda anathera, *Hack. Monogr. Androp.* 669.—Anthistiria, *Wall. Cat.* n. 8773.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4500–7000 ft., and to 9000 ft. in Garwhal, *Duthie.*—DISTRIB. Affghanistan.

Perennial. *Stem* erect, 1–4 ft., slender, leafy. *Leaves* very narrow, ½–⅙ in. broad, rigid, glaucous, margins and upper surface scabrous, scaberulous beneath; sheaths glabrous; ligule oblong, obtuse. *Panicle* 1–2 ft., narrow, glabrous; proper spathes ½–1 in., linear-lanceolate, acute. *Spikes* glabrous. *Involucr. spikelets* more or less hispid, one of each pair shortly stipitate.—Wallich's habitat for his n. 8773, "Bengal, near the Calcutta Bot. Garden," is either an error or the plant was an escape from cultivation. Andersson has two varieties, *α. hirsuta*, invol. spikelets

wholly and pedicelled partially covered with tubercle-based hairs, and *β. glabrescens*, more glaucous, leaves pruinose, invol. spikelets dorsally glabrous or scabrous above, pedicelled glabrous.

§§ *Callus of bisexual spikelets acute.*

10. **A. Hookeri,** *Griseb. in Goetting. Nachr.* (1868) 91; stem slender simple or sparingly branched above, spikes (with their proper sheath) axillary solitary long-peduncled glabrous, invol. spikelets $\frac{1}{3}$–$\frac{2}{3}$ in. sessile linear-lanceolate acuminate gls. 3, bisexual spikelets 1 or 2 scabrid above the middle dorsally rounded, awn $\frac{3}{4}$–1 in. A. gigantea *subsp.* caudata, *in part, Hack. Monogr. Androp.* 676. Androscepia glabrata, *Anderss. in Herb. Kew.*

Sikkim Himalaya; interior ranges, alt. 6500–9000 ft., *J. D. H., Gammie.*

Stem 1–2 ft., shortly creeping at the base, erect or geniculately ascending, as thick as a crow-quill or less. *Leaves* very narrow, rarely $\frac{1}{6}$ in. broad, quite smooth, subglaucous beneath, tips filiform; sheath smooth; ligule short ciliolate. *Spikes* axils in the long erect very slender leaves, rarely geminate in one short outer spathe, $\frac{2}{3}$ in. long, laterally compressed (without an outer spathe exceeding the proper), peduncle 1–2 in., filiform, enclosed sometimes up to the spike in a very slender spathe with a subulate tip; proper spathe linear-lanceolate, acuminate. *Rachis* of spike usually exceeding the invol. spikelets and proper spathe, nearly glabrous. *Invol. spikelets* quite glabrous, keels smooth, very narrowly winged. *Bisexual spikelets* like those of *A. imberbis* in form and colour of gl. I, and in the conic acute callus densely villous with rusty-red hairs; gl. II scabrid towards the tip; awn geniculate, narrowed below to a capillary base; lodicules membranous. *Pedicelled spikelets* much longer than the bisexual, narrowly lanceolate, acuminate, glabrous, keels hardly scaberulous; pedicels slender, glabrous except at the base.—Though nearest allied to *A. gigantea*, which is a thoroughly tropical grass, this species most resembles *A. imberbis*, and especially its var. *Roylei*, from which it is at once distinguished by wanting the long outer spathe, and by the superposed invol. spikelets.

11. **A. gigantea,** *Cav. Ic.* t. 36; tall, usually stout, spikes few in narrow pedicelled fascicles terminating the branches of a compound or decompound inclined or nodding rarely subsimple panicle, proper spathes rather longer than the spikes, involucr. spikelets linear-lanceolate, one of each pair deciduous, bisexual spikelets 1–3 rufously hirsute dorsally channelled. Themeda gigantea, *Hack. Monogr. Androp.* 672.

Lower Himalaya; from Kumaon eastwards, to Assam, Behar and the Khasia Hills, ascending to 4000 ft.—Distrib. China, Malaya, Australia, N. Caledon.

Stem 8–16 ft., often nearly 1 in. diam. below, erect, solid, terete, glabrous, simple below, branching above, leafy. *Leaves* 4–8 ft. by $\frac{1}{2}$–1 in., linear, setaceously acuminate, scaberulous above, glaucous beneath, margins scabridly serrulate, base narrowed, midrib broad, lower bifarious; lower sheaths compressed; ligule short, membranous, ciliolate. *Panicle* 1–3 ft., oblong, rarely simple, inclined, branchlets flexuous; spikes often pendulous; spathes narrowly cymbiform, keel and nerves scabrid. *Spikes* as long as the proper spathes or shorter; peduncle much shorter than the spathe, filiform, erect or divaricate. *Invol. spikelets* $\frac{1}{3}$–$\frac{2}{3}$ in.; gl. I linear-lanceolate, setaceously acuminate, glabrous or hirsute with fulvous hairs, keels scabrid; II shorter, acuminate, ciliate; III and IV still shorter, linear-oblong or lanceolate, ciliate. *Bisexual spikelets* $\frac{1}{5}$–$\frac{1}{3}$ in., linear-lanceolate; callus $\frac{1}{8}$–$\frac{1}{6}$ in. villous with long brown hairs; gl. I coriaceous, acute or acuminate, dorsally 1–3-channelled, more or less villously hirsute all over or below the middle with brown hairs; II acute in the awnless spikelets, obtuse in the awned; III oblong-lanceolate, 1-nerved; IV = III, linear-lanceolate in the awnless spikelets, acute, 1-nerved in

the awned; IV the hyaline base of the awn.—Hackel classifies the form of this protean plant under 6 subspecies and 12 varieties. Of these the Indian (exclusive of intermediates) may be grouped as follows. They do not affect definite areas, and some of them may be different states of one variety.

Subsp. *genuina*, Hack. l. c. 672; panicle decompound, branches branchlets and peduncle of spike villous with rusty hairs, proper sheaths 1–1½ in., spikelets ⅓–⅔ in. or more dorsally hirsute with rusty-brown hairs, bisexual spikelets 1–3 in each raceme ⅓ in. awned or not. A. gigantea, *Cav. l. c.* A. vulpina, *Anderss. in Nov. Act. Sc. Upsal.* III. ii. (1856) 215. Androscepia gigantea, var. *a*, *Brongn. in Voy. Coq. Bot.* 78; *Kunth Enum. Pl.* i. 484 (*excl. Syn.*). Calamincu gigantea, *Roem. & Sch. Syst.* ii. 810 (*non Beauv.*). Perobachne secunda, *Presl. Rel. Hænk.* i. 348, t. 48; *Kunth l. c.* 485.

Subsp. *arundinacea* (including subsp. *intermedia*), Hack. l. c. 674; panicle compound dense or lax, branches and branchlets glabrous, proper spathes 1½–2 in. ciliate, invol. spikelets ⅓–⅔ in. dorsally hirsute with golden or rusty hairs, bisexual spikelets 1 rarely 2 in each spike about ½ in long, awn 1½–4 in. A. arundinacea, *Roxb. Fl. Ind.* i. 251; *Kunth Revis. Gram.* i. 363, t. 95, *Enum.* 482, *Suppl.* 394; *Steud. Syn. Gram.* 401; *Duthie Grass. N.W. Ind.* 23, *Fodd. Grass. N. Ind.* 42. A. subsericans, *Nees ex Steud. l. c.* Cymbopogon arundinaceum, *Schult. Mant.* ii. 457.—Anthistiria, *Wall. Cat.* n. 8763, 8772, 8774 B.—Subsp. *intermedia*, differs from *arundinacea* in the less hirsute male spikelet and in the awn reduced to a bristle.

Subsp. *villosa*, Hack. l. c.; panicle large decompound, branches and branchlets glabrous or scaberulous, proper spathes 1–1½ in., spikes erect or divaricate, invol. spikelets ⅓–½ in. glabrous smooth or scaberulous, bisexual spikelets ¼–⅓ in., awn $\frac{1}{20}$–⅓ in. or 0. A. villosa, *Poir. Encycl. Suppl.* i. 396; *Lamk. Ill.* t. 841, f. 3; *Steud. l. c.* A. mutica, *Steud. l. c.* Androscepia gigantea & mutica, *Anderss. l. c.* 248 (*excl. Syn.*), t. 3 (gigantea). Andr. gigantea, *var.* sundaica, *Buese Pl. Jungh.* i. 364. Aristaria mutica, *Hassk. in Tijdschr. Nat. Gesch.* x. 117, *in Ann. Sc. Nat. Ser.* 3, iv. 178. Heterolytron scabrum, *Jungh. l. c.*—Anthistiria, *Wall. Cat.* n. 8776.—Assam, Khasia Hills, Malacca, Java.

Subsp. *caudata & longispatha*, Hack. l. c. 676, 677; panicle lax-fld. subsimple or decompound, branches and branchlets glabrous, proper spathes 1–1½ in., spikes often divergent, invol. spikelets ⅓–½ in., keels scabrid glabrous, bisexual spikelets 2–3 in each spike, awn ½ in. A. caudata, *Nees in Hook. & Arn. Bot. Beech. Voy.* 245; *Steud. l. c.* 402. Androscepia gigantea, *var.* himalayensis, *Rupv. ex Anderss. l. c.* 248. Andr. gigantea, *v.* armata, *Anderss. l. c.*—Anthistiria, *Wall. Cat.* n. 8774 A.

Var. *longispatha*, Hack. l. c. 677; leaves glaucous beneath smooth except the scabrid margins, stems and sheaths quite glabrous, panicle broad compressed, branches scaberulous, pedicelled spikelets nearly smooth except the scabrid keels, involucr. spikelets about ¾ in.—Terai of the Himalaya, *Kuntze.*—I have seen no authentic specimen.

DOUBTFUL SPECIES.

ANTHISTIRIA sp.? an imperfect specimen from Chota Nagpur, *Dr. Wood* (*Herb. Calcutt.*) with the invol. gls. of *A. gigantea*, var. *villosa*, but with very broad leaves deeply cordate and amplexicaul at the base.

55. ISEILEMA, *Hack.*

Differs from *Anthistiria* in each spike being jointed below the involucral spikelets on the top of its peduncle, and falling away from it as a whole after flowering; whereas in *Anthistiria* the involucrant spikelets are persistent and the rest of the spike deciduous. In the former case, as Hackel observes, the dispersal of the species is by the wind, in the latter

by the callus of the bisexual spikelets piercing the skin or becoming otherwise attached to animals.—Species 5, tropical Asiatic and Australian.

* *Keel and submarginal nerves of the spathes granulate or tubercled.*

1. **I. Wightii,** *Anderss. in Nov. Act. Soc. Sc. Upsal. Ser.* 3, ii. 251; panicle decompound rather dense, spathes linear-lanceolate shorter or rather longer than the peduncle, involl. spikelets $\frac{1}{8}$ in. almost concealing the bisexual. *Hack. Monogr. Androp.* 679; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 218. Anthistiria prostrata, *Willd. Sp. Pl.* iv. 901; *Roxb. Fl. Ind.* i. 250. A. cimicina, *Edgew. in Journ. As. Soc. Beng.* (1852) 182 (*in Bot. Zeit.* (1852) 860); *Steud. Syn. Gram.* 400; *Duthie Grass. N. W. Ind.* 24. A. Wightii, *Nees ex Steud. l. c.*; *Duthie l. c.* A. Linnæana, *Steud. l. c.* Andropogon prostratus, *Linn. Mant.* ii. 304. Cymbopogon glandulosus, *Spreng. Pugill.* ii. 14.—Anthistiria, *Wall. Cat.* n. 8770.

Throughout INDIA; from the Panjab eastwards to Burma, and southwards to Malabar and Mysore.

Perennial; stem 6 to 3 ft., erect or base decumbent, rarely as stout at the base as a goose-quill, usually slender; nodes often bearded. *Leaves* 4–8 in., narrow, smooth or scaberulous, floral scabrid with tubercled margins, upper glabrous or hairy; ligule membranous, truncate. *Panicle* long or short, more or less compound; branches crowded or distant, strict or geniculate; nodes bearded; lower spathes foliaceous, floral $\frac{1}{4}$–$\frac{1}{3}$ in., keels and margins tubercled. *Involucr. spikelets* male or neuter, pedicelled, oblong-lanceolate; gl. I 5-ribbed, scaberulous. *Bisexual spikelets*, gl. I bicuspidate; II 3-nerved; IV a slender awn three times as long as the spikelet or longer.—Very variable in stature, length of leaves and habit of the panicle.

2. **I. argutum,** *Anderss. l. c.* 252; panicle linear elongate very lax, spathes elliptic-lanceolate about three times as long as the peduncle of the spike, involl. spikelets $\frac{1}{4}$ in. shorter than the bisexual. *Hack. Monogr. Androp.* 681. Anthistiria arguta, *Nees ex Steud. Syn. Gram.* 401.—Anthistiria, *Wall. Cat.* n. 8769.

BURMA; at Prome, *Wallich.*

Stem 2–3 ft., very slender, leafy at the base, compressed below. *Leaves* 3–6 in., narrowly linear, coriaceous, smooth except towards the spinulose rounded tips, deeply striate, midrib broad, floral with spinulose margins and ciliate base; sheath compressed; ligule a very short membrane. *Panicle* almost filiform, flexuous, with distant almost capillary branches; nodes ciliate; spathes $\frac{1}{2}$–$\frac{3}{4}$ in., keels and nerves granulate or tubercled. *Involl. spikelets* shortly stoutly pediceiled, linear-lanceolate; glumes 2, I 5-ribbed scaberulous, keels ciliate, tubercled; II 3-nerved. *Bisexual spikelets* linear-lanceolate; gl. I long-beaked, beak scabrid; IV a slender awn.—The materials are scanty; more specimens may modify the above characters.

** *Keel and submarginal nerves of spathe not granulate or tubercled.*

3. **I. laxum,** *Hack. Monogr. Androp.* 682; panicle slender, spikes erect, involl. spikelets with short filiform pedicels covering the fem. glumes 3 glabrous, bisexual spikelet narrowly lanceolate pedicelled glabrous. *Duthie Fodd. Grass. N. Ind.* 43; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vi. (1891) 218. T. prostratum, *Anderss. in Nov. Act. Soc. Sc. Upsal. Ser.* 3, ii. 251 (*excl. Syn.*), t. 111. Anthistiria prostrata, *Willd.*, β. glaucescens, *Nees in Wight Cat.* n. 1711 b. Andropogon parviflorus, *Herb. Wight ex Wall. Cat.* 8767 C. A. prostratum, *Herb. Russ. ex Wall. Cat. l. c.* D.—Anthistiria, *Wall. Cat.* n. 8767 A (*in small part*), B. C. D.

UPPER GANGETIC PLAIN; Patna, *Wallich.* The DECCAN PENINSULA, from the Concan southward, *Wight*, &c.

Stems tufted, 8–36 in., erect or ascending. *Leaves* narrow, 3–10 in., linear, obtuse, base ciliate; sheaths lax; ligule membranous, truncate. *Panicle* flexuous, narrow; branches short, distant; spathes $\frac{1}{4}$ in., elliptic-lanceolate, reddish, keel and nerves scabrid. *Invol. spikelets* $\frac{1}{6}$ in.; pedicels glabrous; gl. I oblong-lanceolate subacute, 5-nerved; II 3-nerved; III linear. *Bisexual spikelets*; pedicel ciliate; gl. I chartaceous, lanceolate, acuminate, tip truncate; II acuminate, 1-nerved; IV awn $\frac{1}{2}$–$\frac{2}{3}$ in., very slender.

4. **I. anthephoroides,** *Hack. Monogr. Androp.* 683; panicle crowded leafy, racemes divergent, invol. spikelets very shortly broadly pedicelled glumes 2, I with 5 strong villous ribs, bisexual spikelet subsessile. Anthistiria prostrata, *var.* spic. masc. longe ciliatis, *Wight Cat.* n. 2335. Anthistiria, *Wall. Cat.* n. 8767 A.

The Southern Deccan Peninsula, *Wight*, &c.

Nearly allied to *T. laxum*, but a shorter stouter plant, with more crowded branches of the panicle and racemes.

55[1]. PSEUDANTHISTIRIA, *Hook. f.*

Not in Clavis, p. 5.

Annual grasses, with the habits and characters of *Anthistiria*, but wanting the involucrant spikelets of that genus.—Distrib. India.

Pseudanthistiria was regarded by Hackel as an anomalous section of his subgenus *Hypogynium* of *Andropogon*, with the habit of *Anthistiria*. As I have pointed out above (p. 168) it is a remarkably distinct genus of *Andropogoneæ* with characters totally at variance with those of *Hypogynium* as given in the "Monogr. Androp." I think that it is one of a natural group with *Anthistiria*, *Iseilema*, *Heteropogon* and *Germainia*. I am doubtful as to the specific value of some of the following, more copious material of all collected by good observers is wanting in this, as in so many other genera of grasses.

1. **P. heteroclita,** *Hook. f.*; leaves 6–12 in. linear glabrous or more or less ciliate nerves distinct, fascicles of spikes about $\frac{1}{2}$ in. broad, proper spathes $\frac{1}{4}$ in. hardly longer than the spikes, sessile spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. hispidulous all over, awn $\frac{2}{3}$ in. base lanceolate. Andropogon heteroclitus, *Nees Fl. Afr. Austr.* 115; *Steud. Syn. Gram.* 389; *Hack. Monogr. Androp.* 400. A. monomeros, *Hochst. in Hohen. Pl. Ind. Or.* n. 183. Anthistiria heteroclita, *Roxb. Fl. Ind.* i. 249; *Kunth Enum. Pl.* i. 483.

Bengal; pastures near Calcutta, *Roxburgh*. The Concan and Canara, *Law*, *Thomson*, &c.

Stem 1–2 ft., geniculate, slender, rarely as thick as a crow-quill, smooth, subsimple or branched. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in. broad, ciliate on both surfaces together with the sheaths and margins with long tubercled-based hairs in Calcutta specimens, nearly glabrous in Western ones; sheaths much shorter than the internodes; ligule short, membranous. *Panicle* not large, leafy, compound, with many shortly peduncled fascicles; proper spathes and pedicelled spikelets with a few long tubercle-based bristles; keel ciliate; base of awn linear-lanceolate.—I have seen no Bengal specimens, but the excellent figure in Roxburgh's "Icones pictæ" leaves no doubt in my mind as to its being of the same species as the western plant, only more copiously ciliate. A specimen in Herb. Kew from Hackel was communicated as *Anthistiria tremula*, the likeness between these two plants being so deceptive.

2. **P. hispida,** *Hook. f.*; leaves 6–10 in. linear and sheaths ciliate with long hairs or glabrescent, nerves distinct, fascicles of spikes $\frac{3}{4}$ in. broad copiously hirsute with tubercle-based bristles, outer spathes $1\frac{1}{2}$–2 in. long,

proper spathes much longer than the spikes, sessile spikelets $\frac{1}{6}$ in., gl. I terete glabrous except as to the scabrid summit, awn 1–1$\frac{1}{4}$ in.

The Concan, *Stocks, Law, Dalzell,* &c. CENTRAL PROVINCES; Khandwa, *Duthie* (No. 8478).

Stem 1–2 ft., rather stout, erect. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in. broad, base narrowed, scaberulous above and on the margins. *Panicle* elongate, simple, leafy.—Closely allied to *P. heteroclita,* and perhaps only a variety of it, but a stouter more hispid plant of a pale green colour, with much longer fascicles of spikelets with longer spathes and glabrous sessile spikelets.

3. **P. umbellata,** *Hook. f.*; stem filiform straggling, leaves 1–2 in. glabrous linear-oblong acute base rounded sessile or petiolulate, nerves very slender, fascicles of spikelets few axillary $\frac{1}{4}$–$\frac{1}{2}$ in. broad with few sparingly ciliate spathes and spikes, outer spathes $\frac{1}{2}$–1 in., proper spathes rather longer than the spikes, sessile spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. scaberulous, pedicelled naked, awn $\frac{1}{2}$–$\frac{2}{3}$ in. Andropogon umbellatus, *Hack. Monogr. Androp.* 401. Anthistiria heteroclita, β foliis glabris, *Wight Cat.* n. 1706.

DECCAN PENINSULA, *Wight*; Cochin, *Johnstone.* CEYLON, *Gardner,* &c.

A very slender glabrous plant, with prostrate creeping branched stems rooting at the nodes. *Leaves* distant, with a few scattered cilia on both surfaces, nearly smooth; sheaths shorter than the blade. *Fascicles* of spikelets axillary, glabrous or with a few tubercle-based cilia, on simple rarely branched capillary peduncles shorter than the leaves; lower peduncles sometimes elongate 1–3 in. long and bearing several fascicles; outer spathes $\frac{1}{3}$–$\frac{2}{3}$ in. long. *Spikes* 3–6 in a fascicle, proper spathe glabrous. Gl. I of *sessile spikelet* dorsally concave; base of awn as in *P. heteroclita.*

4. **P. burmanica,** *Hook. f.*; stem filiform straggling, leaves 1–2 in., linear-oblong or lanceolate glabrous, nerves very slender, fascicles of spikelets few axillary very narrow with few sparsely ciliate spathes and spikes, outer spathes 1–1$\frac{1}{2}$ in., proper spathes longer than the spikes, sessile spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. scaberulous, pedicelled naked, awn 1–1$\frac{1}{2}$ in. base subulate-hastate.

PEGU, *Kurz.*

Habit of *P. umbellata* (of which it is possibly a variety) but leaves narrower, fascicles of spikelets 1–1$\frac{1}{2}$ in. long, very narrow, with much longer awns, the base of which is suddenly dilated and hastate or sagittate at the dilatation.

Tribe V. PHALARIDEÆ. (See p. 5.)

56. PHALARIS, *Linn.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-fld., in contracted or spiciform panicles, laterally compressed, rachilla with 1 or 2 minute scales (imperfect gls.) below gl. III, beyond which it is not produced, jointed at the base. *Glumes* (perfect) 3, I and II subequal, empty, persistent, keels winged or not; III much smaller, bisexual, 3–5-nerved, thin, at length coriaceous; palea like the gl. 2-nerved. *Lodicules* 2. *Stamens* 3. *Styles* 2, free. *Grain* ovate or oblong, free within the gl.—Species 9 or 10 temperate and tropical.

The uppermost glume alone being flowering should technically refer this genus to the Series of *Panicaceæ*; but its affinities are with *Poaceæ*. *P. canariensis,* Linn. (Canary Grass) is given as a N.W. India Grass by Duthie and others, but I have seen no specimens; it closely resembles *P. minor,* differing in the quite entire wings of the gls. *P. paradoxa,* Linn. fil., is stated by Duthie Grass. N.W. Ind. to

be Indian on the authority of Wallich (Nepal), and Stewart (The Panjab); but in Fodd. Grass. N. Ind. he says that he has not seen specimens; nor have I. It is a Mediterranean plant.

* PHALARIS proper. *Spikelets* in a dense cylindric or ovoid spiciform panicle; gls. I and II with winged keels.

1. **P. minor,** *Retz. Obs.* iii. 8; *Kunth Enum. Pl.* i. 32; *Trin. Diss.* ii. 254, *Sp. Gram. Ic.* t. 79; *Steud. Syn. Gram.* ii.; *Wight Cat.* n. 1738; *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 45; *Aitchis. Cat. Panjab Pl.* 158; *Ledeb. Fl. Ross.* iv. 455; *Boiss. Fl. Orient.* v. 472. P. ambigua, *Fig. & Notar. in Mem. Acad. Turin. Ser.* II. xii. (1852) 326, t. 10, f. 6. P. aquatica, *Ait. Hort. Kew.* i. 56. P. bulbosa, *Desf. Fl. Atlant.* i. 35 (*non Linn.*). P. canariensis, *Wall. Cat.* n. 3782 (*non Linn.*). P. capensis, *Thunb. Prodr. Fl. Cap.* 19. P. nepalensis, *Trin. Sp. Gram. Ic.* t. 80; *Kunth l. c.* 33; *Steud. l. c.* 10; *Duthie l. c.* Alopecurus otiporensis, *Griff. Notul.* iii. 94, *Ic. Pl. Asiat.* t. 143, f. 1.

Plains of WESTERN INDIA, and the HIMALAYA from Kashmir to Nepal, ascending to 5000 ft.—DISTRIB. Westwd. to the Canaries, S. Africa, Austral.

Annual. *Stem* 1–3 ft., stout or slender, leafy. *Leaves* long, linear, acuminate; sheath smooth; ligule oblong, scarious. *Panicle* small and ovoid, or longer and cylindric, 2½–3½ in. long by ¾ in. diam., green. *Spikelets* ⅕ in. broad, very shortly pedicelled, shining; gls. I and II acuminate, wings irregularly crenate or serrulate; III ovate, acute, silky, with one bristle-like imperfect gl. at its base.

** DIAGRAPHIS, *Trin.* (Gen.). *Spikelets* in a thyrsiform panicle; gls. I. and II. not winged.

2. **P. arundinacea,** *Linn. Sp. Pl.* 55; *Fl. Dan.* t. 259; *Host Gram. Austr.* ii. t. 33; *Engl. Bot.* t. 2160; *Kunth Enum. Pl.* i. 33, *Suppl.* 23; *Steud. Syn. Gram.* 11; *Boiss. Fl. Orient.* v. 474. P. americana, *Ell. Sketch.* i. 101. P. colorata, *Beauv. Agrost.* 172. P. intermedia, *Bosc ex Poir. Encycl. Suppl.* i. 300. P. picta, *Hort. ex Steud. Nom. Ed.* I. 609. Digraphis arundinacea, *Trin. Fund. Agrost.* 127; *Ledeb. Fl. Ross.* iv. 454. D. americana, *Loud. Hort. Brit.* 27. Baldingera arundinacea, *Dumort. Obs. Gram. Belg.* 130. B. colorata, *Gærtn. Mey. & Scherb. Fl. Wett.* i. 96. Calamagrostis colorata, *DC. Fl. Franc.* iii. 26. Arundo colorata, *Ait. Hort. Kew.* i. 116; *Engl. Bot.* t. 402; *Knapp. Gram. Brit.* i. 98.

KASHMIR; Wolar Lake, alt. 5550 ft., *Falconer*, &c.—DISTRIB. N. temp. and Arctic regions.

Perennials. *Rootstock* creeping. *Stems* 2–6 ft., stout, erect. *Leaves* long, ⅛–½ in. broad, finely acuminate; sheaths smooth; ligule large. *Panicle* 4–8 in., suberect; branches 1–2 in., spreading in flower. *Spikelets* ⅙ in., densely crowded on the scabrid branchlets, very shortly pedicelled; gl. I and II glabrous, lanceolate, acuminate; I nerveless; II 3-nerved; III ovate-lanceolate, sparsely hairy, with 2 minute linear gls. on the rachilla. *Lodicules* silky.

DOUBTFUL SPECIES.

P. PECTINATA, *Roth. Nov. Sp.* 34; *Kunth Enum. Pl.* i. 34; panicle cylindric spiciform, gl. I and II navicular margins membranous ciliate-pectinate, outer corolla 2-valved villous.

57. ANTHOXANTHUM, *Linn.*

Annual or perennial sweet-scented grasses. *Spikelets* 2-fld, narrow; in a spiciform panicle, persistent on the short pedicels. *Glumes* 5, I and II herbaceous, empty, persistent, acute or mucronate; I small, 1-nerved; II longest, 3-nerved, III and IV very short, keeled, hairy, 2-fid, with a

dorsal bent awn; V flg., minute, hyaline, broad, obtuse, glabrous, awnless, 5–7-nerved; palea narrow, 1-nerved. *Lodicules* 0. *Anthers* 2, large. *Ovary* glabrous; styles long. *Grain* terete, acute, free within the shining gl. and palea.—Species 4 or 5, native of temperate regions.

A. ODORATUM, *Linn. Sp. Pl.* 28; *Kunth Enum. Pl.* i. 38, *Suppl.* 28, t. 8; *Host Gram. Austr.* t. 5; *Fl. Dan.* 666; *Reichb. Ic. Fl. Germ.* 106; *T. Nees Gen. Fl. Germ. Monocot.* i. t. 16; *Knapp. Gram. Brit.* t. 1; *Engl. Bot.* t. 647; *Trin. Sp. Gram. Ic.* t. 14; *Ledeb. Fl. Ross.* iv. 408; *Boiss. Fl. Orient.* v. 470.

Occasionally found in the Hill districts of INDIA, but only as introduced by man or as an escape from cultivation.—Native of Europe and N. Asia.

Perennial, sweet-scented, especially when dry. *Stem* 6–18 in., tufted, erect or ascending. *Leaves* flat, hairy. *Panicle* 1–5 in., pubescent or villous. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., fascicled, sometimes squarrosely, green; gl. I ovate, acute; II lanceolate; III and IV curved, obliquely truncate.—The glumes are often described as 6. The sixth, though 1-nerved, is, I think a palea, analogous to the 1-nerved palea of *Hierochloa* and of a few other grasses, the nerves being theoretically formed of two confluent ones.

58. **HIEROCHLOA,** *Gmel.*

Perennial, erect, sweet-scented grasses. *Leaves* flat. *Spikelets* 1–3-fld., laterally compressed, panicled, not jointed or their pedicels, rachilla not produced above gl. V. Glumes 5; I and II equal or unequal, 1–3-nerved, hyaline or scarious, shining, keeled; III and IV usually similar, awned, 2–3-androus or neuter; palea 2-nerved or 0; V fem. or bisexual, palea 1- (rarely 2-) nerved. *Lodicules* 2, small. *Anthers* linear. *Styles* free. *Grain* oblong, free within the gls.—Species 8–10, of temp. and cold regions.

* Panicle effuse. Spikelets long-pedicelled; gl. III IV and V hirsute and ciliate, III and IV paleate, palea narrow, male; V smaller; rachilla produced between the gls.

1. **H. laxa,** *Br. in Wall. Cat.* n. 3796; leaves ensiform acute, spikelets $\frac{1}{4}$ in. long, gl. I and II equal or subequal faintly nerved, III and IV truncate very shortly awned, V hirsute above the middle not awned. *Duthie Grass. N.W. Ind.* 25.

WESTERN HIMALAYA, from Kashmir, alt. 10–12,000 ft., to Kumaon, alt. 12–16,000 ft.

Stem 1–2 ft., ascending from a stout creeping rootstock. *Leaves* 6–10 by $\frac{1}{3}$–$\frac{1}{2}$ in., quite smooth; ligule large, oblong. *Panicle* 3–5 in., lax, oblong, inclined; branches solitary or geminate and pedicels capillary. *Spikelets* much compressed, brown; gl. I 1-nerved; II faintly 3-nerved; IV sometimes fem. and diandrous; palea of V sometimes distinctly 2-nerved, but usually 1-nerved, more or less hispid.

2. **H. flexuosa,** *Hook. f.*; leaves narrowly linear, spikelets $\frac{1}{4}$ in. long, gl. I and II subequal acuminate 3-nerved, III 2-toothed very shortly awned, III acutely 2-fid awn longer than the gl., IV not awned villous in the upper half, palea 1-nerved.

SIKKIM HIMALAYA; Bijean, *King's Collector.*

Stem 2–2$\frac{1}{2}$ ft., erect, very slender. *Leaves* about $\frac{1}{6}$ in. broad; ligule oblong. *Panicle* 2–3 in. long and broad, very lax-fld.; rachis branches and pedicels all capillary and flexuous. *Spikelets* much compressed, brown; gl. I and II lanceo-

late, III and IV with a ring of hairs on the callus; V 5-nerved; palea 2-toothed, hairy above the middle.

** *Panicle* contracted. *Spikelets* shortly pedicelled or sessile; gls. III and IV hirsute, paleate or epaleate, male or neuter; V much smaller, convolute, ovoid, glabrous, its palea linear, concave, 1-nerved; rachilla not produced between gl. II and IV.

3. **H. Hookeri,** *Clarke mss.*; spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long ovoid, gl. I and II very unequal acuminate, III shortly 2-fid shortly awned in the sinus paleate male, IV almost 2-partite epaleate neuter, segments lanceolate acute, awn in the sinus twice as long as the gl.—Ataxia Hookeri, *Griseb. in Goett. Nachr.* (1868) 77.

E. Nepal and Sikkim Himalaya; in marshes, alt. 9–11,000 ft., *J. D. H., Gammie.*

Stem 6 in. 2 ft., erect, ascending or geniculate below, sometimes as thick as a crow-quill. *Leaves* long, narrow, smooth; ligule oblong. *Panicle* 5–7 in. long; branches erect, subsecund; pedicels very short. *Spikelets* greenish; gl. I 1-nerved; II 3-nerved; III and IV sessile; V stipitate, thinly coriaceous, subacute.

4. **H. gracillima,** *Hook. f.*; very slender, panicle small, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. gl. I and II very unequal, III and IV epaleate neuter, III shortly bifid awn in the sinus very short, IV tip obtusely 2-toothed, awn nearly basal twice as long as the gl., palea of V 1-nerved.

Sikkim Himalaya, alt. 10–11,000 ft., *J. D. H.*

A much more slender grass than *H. Hookeri*, with short very narrow leaves 2–4 in. long, narrowed from the base to the tip. *Panicle* $1\frac{1}{2}$–2 in. long, drooping; rachis flexuous; branches very short and few-fid. *Spikelets* yellow or purplish, very shortly pedicelled.

5. **H. khasiana,** *Clarke mss.*; slender, panicle very narrow, spikelets $\frac{1}{8}$ in. long ovoid, gl. I and II subequal acuminate, III and IV epaleate neuter, III 2-fid to the middle, awn in the sinus as long as the gl. or shorter, IV 2-fid to the middle awn exceeding the gl.

Khasia Hills, alt. 4500–6000 ft., *Clarke.*

Stem 1–2 ft., ascending from a shortly creeping base. *Leaves* 4–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., tapering from the base to the tip; ligule oblong. *Panicle* 1–4 in., very narrow; branches short, erect, few-fid. *Spikelets* greenish-brown, erect.

6. **H. Clarkei,** *Hook. f.*; tall, slender, panicle very narrow, spikelets $\frac{1}{5}$ in. long oblong, gl. I and II very unequal ovate-oblong acute, III shortly 2-fid shortly awned in the sinus paleate neuter, IV bifid to below the middle epaleate neuter, awn in the sinus twice as long as the gl.

Khasia Hills, at Laílan Kote, alt. 5500 ft., *Clarke.*

Stem 2 ft., slender, geniculate below. *Leaves* 6–8 by $\frac{1}{6}$–$\frac{1}{4}$ in., narrowed from the base to the tip; ligule short. *Panicle* as in *H. khasiana*, but spikelets nearly twice as large and narrower in proportion, and gl. IV with a long exserted awn.

Tribe VI. Agrostideæ. (See p. 5.)

59. **ARISTIDA,** *Linn.*

Annual or perennial grasses. *Leaves* usually convolute. *Spikelets* panicled, 1-fld., rachilla (or callus of fl. gl.) articulate at the base. *Glumes* 2, I and II empty, very narrow, keeled, persistent; III narrow, rigid,

cylindric, convolute, acuminate, tip produced into a long 3-partite (very rarely simple) naked or feathery awn twisted below the branches; palea very narrow, embraced by the gl., sometimes minute or 0. *Lodicules* 2. *Stamens* 3. *Styles* distinct. *Grain* narrow, free within the closely convolute gl.—Species (assumed) about 100, natives of warm countries.

The species and synonymy as given below have been revised by Dr. Stapf with the Oriental and African.

Sect. I. Chætaria. *Awn* tripartite from the base, not or imperfectly articulate with the top of the gl., persistent, glabrous.

1. **A. Cumingiana,** *Trin. & Rupr. in Mem. Acad Petersb. Ser.* VI. vii. (1849) 134; annual, dwarf, panicle very slender, spikelets (without the awns) $\frac{1}{12}$–$\frac{1}{10}$ in., awn inarticulate at the base. *Steud. Syn. Gram.* 140; *Miq. Fl. Ind. Bat.* iii. 381; *Hance in Journ. Linn. Soc.* xiii. (1873) 135. A. capillacea, *Cav. Ic.* v. 43, t. 468, f. 1 (*non Lamk.*); *Steud. l. c.* 134. A. delicatula, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 293; *Steud. l. c.* 139. A. tenella, *Kurz in Herb. Calcutt.* A. trichodes, *Walp. Ann.* iii. 753; *Miq. l. c.* 380; *Steud. l. c.* 140. Chætaria trichodes, *Nees in Hook. Kew Journ.* ii. (1850) 101.

W. Bengal, *Kurz.* Chota Nagpore, *Clarke.* Pegu, *Kurz*; on the Shan Hills, *Collett.*—Distrib. China, Philippines, Afr. trop.

Stem 3–10 in., tufted, very slender. *Leaves* filiform. *Panicle* subcylindric, narrow, loosely branched, rachis branches and pedicels capillary, scaberulous. *Spikelets* green or purplish; gls. acuminate, II longest; III as long as I, scaberulous; arms of awn twice as long as the gls., capillary, median longest.

2. **A. Adscensionis,** *Linn. Sp. Pl.* 82 (*excl. Syn. Sloane*); annual or perennial, panicle contracted, branches short or elongate and naked below, spikelets (excl. awns) $\frac{1}{4}$–$\frac{1}{3}$ in. acute, gl. I acuminate not awned, II obtuse or emarginate and mucronate, awn inarticulate at the base. *Kunth Enum. Pl.* i. 190; *Steud. Syn. Gram.* 139.

Throughout the Plains and low Hills of India, Burma and Ceylon, ascending to 8000 ft. in Kashmir.—Distrib. Most warm countries.

Stems 6 in. —3 ft., tufted, usually almost filiform, rarely as thick as a crow-quill, smooth. *Leaves* very narrow, smooth or scaberulous. *Panicle* 3–12 in., subsimple or compound, rachis and capillary branches nearly smooth; branches very short with subsessile fascicles of spikelets, or longer, and erect or spreading. *Spikelets* pale green or purplish; gl. I $\frac{1}{5}$–$\frac{1}{4}$ in., acute; II $\frac{1}{4}$–$\frac{1}{3}$ in., tip truncate mucronulate; III $\frac{1}{6}$–$\frac{3}{4}$ in., smooth or scabrid; middle branch of awn $\frac{1}{3}$–$\frac{2}{3}$ in., rarely 1 in.

Dr. Stapf, who has reviewed the whole genus, informs me that besides the following synonyms, which apply to Old World forms, there are in the New World 11 others under *Aristida*, and 14 under *Chætaria*.

Var. *typica*, Stapf. mss.; gl. III about as long as II. A. abyssinica, *Trin. & Rupr. in Mem. Acad. Petersb. Ser.* VI. vii. (1849) 134. A. cærulescens, *Desf. Fl. Atlant.* i. 109, t. 21, f. 2; *Kunth l. c.* 191, *Suppl.* 146; *Steud. l. c.* 138. *Boiss. Fl. Orient.* v. 491; *Duthie Grass. N.W. Ind.* 26. A. canariensis, *Willd. Enum. Pl.* 99. A. chætophylla, modatica, simplicissima & Teneriffæ, *Steud. l. c.* 139, 420. A. curvata, *Nees ex A. Rich. Tent. Fl. Abyss.* ii. 392. A. depressa, *Retz. Obs.* iv. 22; *Roxb. Fl. Ind.* i. 351; *Wall. Cat.* n. 3786; *Kunth. l. c.* 190, *Suppl.* 146; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 108; *Dalz. & Gibs. Bomb. Fl.* 295; *Aitch. Cat. Panjab Pl.* 164 (*excl. Syn.* setacea); *Benth. Fl. Austral.* vii. 563; *Duthie l. c. & Fodd. Grass. N. Ind.* 47, t. 30. A. divaricata, *Jacq. Eclog. Gram.* 7, t. 6 (*non Willd.*). A. elatior, *Cav. Ic.* vi. 65, t. 589, f. 1; *Kunth l. c.* i. 191. A. festucoides, *Hochst. et Steud. ex Trin. & Rupr.* (*non Poir.*). A.

gigantea, *Linn. f. Suppl.* 113; *Kunth l. c.* 194, *Suppl.* 150. A. Jacquiniana, *Tausch. in Flora* (1836) 508. A. Heymannii, *Regel in Act. Hort. Petrop.* vii. (1880) 649. A. Hystrix, *Duthie Fodd. Grass. N. Ind.* 47, t. 31 (*not of Linn. fil.*). A. nutans, *Willd. Hort. Berol. ex Steud. Nomencl.* Ed. II. i. 131. A. paniculata, *Forsk. Fl. Æg. Arab.* 25 (*ex descript.*). A. pusilla, *Trin. et Rupr. in Mem. Acad. Petersb. Ser.* VI. vii. (1849) 140. A. setacea, *Trin. l. c.* i. (1831) 84 (*non Retz.*); *Wall. Cat.* n. 3785; *Steud. l. c.* 139. A. vulgaris, *Trin. & Rupr. in Mem. Acad. Petersb. l. c.* 131 (with 10 vars.) *Steud. l. c.* 138. Chætaria Ascenscionis, cærulescens, canariensis, depressa, elatior, & gigantea, *Beauv. Agrost.* 30. C. curvata & mauritiana, *Nees Fl. Afr. Austr.* 186, 188. C. Hystrix, *Wight Cat.* n. 1737 (*non Beauv.*).

Var. A. æthiopica, *Trin. & Rupr. l. c.* 167. A. Ehrenbergii, *Trin. & Rupr. Stipac.* 136; *Steud. l. c.* 138. A. festucoides, *Poir. Encycl. Suppl.* i. 453 (*ex Trin.*); *Kunth Enum. Pl.* i. 197. A. mutabilis, *var.* æquilonga, *Trin. & Rupr. in Mem. Acad. Petersb. Ser.* VI. vii. (1849) 150. A. pumila, *Desne in Ann. Sc. Nat. Ser.* II. iv. (1835) 85; *Boiss. l. c.* 496; *Steud. l. c.* 138. A. spicigera, *Trin. & Rupr. l. c.* 136; *Steud. l. c.* A. vulgaris, *Trin. & Rupr. l. c. in part* (with 6 vars.). —*Aristida Wall. Cat.* n. 3788.

3. **A. setacea,** *Retz. Obs.* iv. 22; perennial, panicle contracted, spikelets (excl. awn) $\frac{1}{2}$–$\frac{2}{3}$ in., gl. I and II long-awned, awn inarticulate at the base, middle branch $\frac{1}{2}$–$1\frac{1}{2}$ in. *Kunth Enum. Pl.* i. 191 (*excl. Syn. depressa*), *Suppl.* 148; *Steud. Syn. Gram.* 141; *Roxb. Fl. Ind.* i. 349; *Wall. Cat.* n. 3785 A. B *in part*); *Grah. Cat. Bomb. Pl.* 218; *Dalz. & Gibs. Bomb. Fl.* 295; *Duthie Grass. N.W. Ind.* 27. A. adscendens, *Trim. Cat. Ceyl. Pl.* 108. A. arundinacea, *Roem. ex Retz. l. c.* (*non Linn.*). A. cærulescens, *Thw. Enum. Pl. Zeyl.* 370. A. Hystrix, *Baker Fl. Maurit.* 451 (*excl. Syn.*). A. quinqueseta, *Steud. l. c.* 420. Chætaria setacea, *Beauv. Agrost.* 36. C. depressa, *Herb. Wight propr.* n. 1735.

Western India; from Behar and the Concan southwd. Ceylon; *Walker*, &c.—Distrib. Mascarene Islds.

Stem 3–4 ft., sometimes as thick at the base as a goose-quill, stout, erect, simple, or subfastigiately branched with open sheaths at the ramifications. *Leaves* filiform, convolute, scaberulous. *Panicle* 6–12 in., inclined; branches short, subsecund, scaberulous, usually fascicled and erect. *Spikelets* green or purplish; gl. I narrowed into a short awn; 2 minutely 2-toothed, awn short; III nearly smooth; beard of callus copious, white, silky.

4. **A. cyanantha,** *Steud. Nom. Ed.* II. i. 131; *Syn. Gram.* 141; tall stout, panicle effuse, branches flexuous widely spreading, spikelets (excl. awns) $\frac{1}{3}$–$\frac{1}{2}$ in., gls. I and II shortly awned, awn of III not articulate with the gl. branches very long flexuous middle one up to $2\frac{1}{2}$ in. *Trin. in Act. Acad. Sc. Petrop. Ser.* VI. v. (1842) 150; *Boiss. Fl. Orient* v. 492; *Duthie Grass. N.W. Ind.* 26 (*excl. Syn.*). Chaetaria cyanantha, *Nees in Royle Ill. Bot. Himal.* 424.

Western Himalaya, alt. 3–5000 ft., from Kashmir to Kumaon; and low hills of the Panjab.—Distrib. Affghanistan.

Perennial. *Stem* 3–6 ft., attaining the thickness of a swan's quill below. *Leaves* 6–12 by $\frac{1}{5}$–$\frac{1}{3}$ in., at length convolute, quite smooth, glaucous; sheaths smooth. *Panicle* 12–18 in., very variable in amount of branching; branches 4–12 in., solitary or 2–3-nate, usually naked for 2–6 in., scaberulous. *Spikelets* usually dark purple; gls. I and II with nearly smooth keels, tip of II fimbriately toothed; III, callus hairs very few; awn minutely scaberulous.

5. **A. Hystrix,** *Linn. f. Suppl.* 113; perennial, panicle as broad as long branches distant rigid widely spreading, spikelets (excl. awns) $\frac{1}{2}$–$\frac{3}{4}$ in.,

gls. I and II. finely acuminate or awned, awn of III not articulate with the gl. branches very long rigidly flexuous middle one 1–2 in. *Trin. Diss.* i. 187, *in Act. Petrop.* (1829) 83, (1836) 47; *Kunth Enum. Pl.* i. 350, *Suppl.* 147; *Roxb. Fl. Ind.* i. 350; *Wall. Cat.* n. 3784; *Grah. Cat. Bomb. Pl.* 335; *Dalz. & Gibs. Bomb. Fl.* 295; *Steud. Syn. Gram.* 141. A. tripilis, *Thunb. Fl. Ceyl. Diss.* 2, *ex Trin. & Rupr. in Mem. Acad. Petersb. Ser.* VI. vii. (1849) 147. Chaetaria Hystrix, *Beauv. Agrost.* 30.

The DECCAN PENINSULA, from the Concan and Central Provinces southward. CEYLON (*Thunberg*).

Stem 6 in.–2 ft., as thick as a crow-quill or less, stiff, stout and erect or long inclined or prostrate and proliferously branched with open sheaths at the ramifications. *Leaves* 2-4 in., narrow, convolute, glaucous. *Panicle* 4–6 in.; rachis stout flexuous and angular, branches and branchlets smooth. *Spikelets* straw-colrd.; gls. I and II membranous or subchartaceous, keels smooth; II most minutely toothed at the base of the awn; III smooth, callus naked, awns most minutely scaberulous.—I have seen no Ceylon specimens, for which habitat Thunberg (fid. Trinius) is the authority.

6. **A. mutabilis,** *Trin. & Rupr. in Mem. Acad. Petersb. Ser.* VI. vii. (1849) 150 (excl. var. *æquilonga*); annual, panicle very narrow subcylindric, branches very short crowded, spikelets (excl. awns) $\frac{1}{4}$ in., gls. I and II shortly awned, awn of III obscurely articulate with the gl., column long, branches rather short, middle one about $\frac{1}{2}$ in. *Steud. Syn. Gram.* 141. A. articulata, *Edgew. in Journ. Linn. Soc.* vi. (1862) 209; *Aitch. Cat. Panjab Pl.* 164; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47. A. Kunthiana & meccana, *Trin. & Rupr. l. c.* 151 (*ex descr.*) 152; *Steud. l. c.* 141. A. Schweinfurthii, *Boiss. Fl. Orient.* v. 493. A. spicata, *Rottl. mss.* A. tenuis, *Hochst in Flora*, xxviii. (1855) 200.

The PANJAB & RAJPOOTANA; Multan, *Edgeworth*; Jodhpore, *King*. SOUTHERN INDIA, *Heyne*, *Wight*, &c.—DISTRIB. Arabia, Africa trop.

Stems 6–12 in., many ascending from the root, simple or proliferously branched, slender. *Leaves* 1–3 in., very slender, curved, convolute, rigid, smooth. *Panicle* 3–6 in., branches all very short and crowded, or with sometimes a few remote lower down or the stem ascending from a naked base and bearing a dense oblong fascicle of spikelets, rachis smooth, branches scaberulous. *Spikelets* very shortly pedicelled, pale green or straw-colrd.; gl. I $\frac{1}{5}$ in., keel scaberulous; II $\frac{1}{4}$ in., tip 2-toothed below the awn; III scaberulous, callus shortly bearded; column of awn nearly as long as the gl., slender, smooth, branches capillary.—King's specimens from Jodhpore are in a starved state and mixed with *A. Adscenscionis*.

Sect. II. ARTHRATHERUM. *Column of awn* long, twisted, articulate on the glume (obscurely in *A. redacta*), branches glabrous, rarely 0.

7. **A. funiculata,** *Trin. & Rupr. in Mem. Acad. Petersb. Ser.* VI. vii. (1849) 159; annual, very slender, panicle lax narrow, branches very short, gls. I and II $\frac{1}{2}$–1 in. subequal awned, column of awn 1 in. or less, branches capillary 1–3 in. *Steud. Syn. Gram.* 142; *Aitchis. Cat. Panjab Pl.* 164; *Boiss. Fl. Orient.* v. 492 (*in part*); *Duthie Fodd. Grass. N. Ind.* 47. A. funicularis, *Trin. ex Steud. Nomencl. Ed.* II. i. 131; *Edgew. in Journ. As. Soc. Beng.* xxi. (1852) 160, 163 (tœnicularis). A. Kotschyi, *Hochst. ex Steud. Syn. Gram.* 142. A. macrathera, *A. Rich. Tent. Fl. Abyss.* ii. 393; *Steud. l. c.* 142; *Boiss. l. c.* 493 (macranthera). A. mallica, *Edgew. in Journ. Linn. Soc.* vi. (1862) 209; *Aitch. l. c.*; *Duthie l. l. c. c.* A. murina, *Aitchis. l.c.* 164 (*non Cav.*); *Duthie Grass. N.W. Ind.* 26. A. paradoxa, *Schmidt Fl. Cap. Verd.* 140. A. pilosa, *Herb. Heyne* (*non Labill.*). A. Royleana, *Trin. & Rupr. in Mem. Acad. Petersb.*

VI. vii. (1849) 160; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1892) 358. A. stipacea, *Ehrenb. & Hempr. ex Trin. & Rupr. l. c.* Chaetaria murina, *Nees ex Trin. & Rupr. l. c.* 160. C. murina, β. villosa, *Nees ex Wight Cat.* n. 1736. C. Royleana, *Nees ex Steud. Syn. Gram.* 143. Arthratherum Kotschyi, *Hochst. ex Trin. l. c.*—Aristida, *Wall. Cat.* n. 3787.

Plains of the PANJAB from the Sutlej westward, RAJPOOTANA, and from the CONCAN southward.—DISTRIB. Beluchistan, Arabia, Trop. Africa.

Stems many, geniculately ascending, 10 in.–2 ft. *Leaves* very slender, flat or convolute, base ciliate with long hairs. *Panicle* 4–10 in., branches erect capillary. *Spikelets* variable in length, pale; gl. I rather shorter than II, keels scaberulous; III smooth, callus sparsely bearded or naked; column of awn very slender, minutely scaberulous, twisted, branches straight capillary.

Var. *Royleana*, leaves eciliate, spikelets smaller, on more distant spreading flexuous branches, gl. I ½ in. or less, column of awn $\frac{1}{6}$–$\frac{1}{4}$ in., branches more unequal, longest $\frac{3}{4}$ in.—A. Royleana, *Trin. & Rupr. l. c.* 160; *Steud. l. c.* 143. Chaetaria Royleana, *Nees ex Steud. l. c.* Arthratherum Royleanum, *Edgew. ex Aitchis. l. c.*—The Panjab, Kangra, alt. 3000 ft., *Clarke.*

Var. ? *Stocksii*; gl. I = ¼ II.—Concan? *Herb. Stocks.*

8. **A. hystricula,** *Edgew. in Journ. Linn. Soc.* vi. (1862) 208; dwarf, very slender, 1–2 in. high, panicle very small narrow much shorter than the awns, gls. I and II $\frac{1}{5}$ in. subequal or I shorter aristately acuminate, column of awn ¼ in. twisted, branches subequal ½–⅔ in. *Aitchis. Cat. Panjab Pl.* 164; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47. A. funiculata, *Boiss. Fl. Orient.* v. 493 (the Beluchist plant only).

The PANJAB; Multan, *Edgeworth.* SCIND; near Kurrachee, *Stocks.*—DISTRIB. Beluchistan.

Annual. *Stems* very many from the root, ½–1 in., densely crowded. *Leaves* subulate, curved, convolute, acuminate, glabrous. *Panicle* without the awns ½–1 in.; branches few, short, erect. *Spikelets* erect; gls. I and II very narrow; callus of III minute, glabrous; column of awn capillary, twisted, smooth, branches of extreme tenuity.

9. **A. redacta,** *Stapf in Kew Bullet.* (1892) 85; stems tufted, tall or short, panicle large effuse, branches spreading, gls. I and II subequal shortly awned about ½ in. long, II deciduous, column of awn capillary twisted, branches 0 or very short. A. depressa, *Retz. Herb. Ind. Or. Hf. & T. in part.* Stipa aristoides, *Stapf ex Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1892) 358.

LOWER BENGAL; Burdwan, *Clarke.* The CONCAN, CENTRAL INDIA, and the CENTRAL PROVINCES, *Stocks, Law,* &c.—DISTRIB. S. Persia.

Annual. *Stems* 6 in.–2 ft., rather stout or slender, densely tufted, simple, or proliferously branched in robust specimens. *Leaves* 4–8 in., very slender, convolute, ciliate with long hairs at the base. *Panicle* 6–12 in., rachis slender smooth; branches usually binate, capillary, flexuous, smooth, erect or spreading, each with one or few spikelets. *Spikelets* on short or long capillary pedicels, green or purplish; column of awn gradually dilating below, 3-nerved, convolute and passing into the glume from the top of which it separates readily but without an indication of the joint.

Sect. III. STIPAGROSTIS. *Awn* feathery.

10. **A. hirtigluma,** *Steud. Nom. Ed.* II. ii. 231, *Syn. Gram.* 144; very slender, panicle narrow strict or flexuous, branches very short, gl. I and II unequal, III muriculate, awn capillary plumose middle branch 1½ in. lateral much shorter naked of extreme tenuity. *Trin. & Rupr. in Mem. Acad. Petersb. Ser.* VI. v. (1842) 171; *Aitchis. Cat. Panjab Pl.* 164;

Duthie Grass. N.W. Ind. 26, *Fodd. Grass. N. Ind.* 47; *Boiss. Fl. Orient.* v. 496. A. ciliata, *Steud. & Hochst. ex Steud. Nom. Ed.* II. i. 131 (*non Desf.*). A. decorata, *Steud. Syn. Gram.* 421. A. paradisea, *Edgew. in Journ. As. Soc. Beng.* xvi. (1847) ii. 1219. A. pogonoptila, *Boiss. l. c.* A. Schimperi, *Hochst. et Steud. ex Steud. l. c.* 143. Arthratherum ciliatum, *Nees in Linnæa*, vii. (1832) 287, *Fl. Afr. Austr.* i. 182. Arth. elatum, *Boiss. Diagn. Ser.* II. iv. 128. Arth. hirtiglume & pogonoptilum, *Jaub. & Spach, Ill. Pl. Orient.* iv. 52, 56. Arth. Schimperi, *Nees Fl. Afr. Austr.* 178.

The PANJAB, *Jacquemont, Falconer*, &c. PESHAWUR, &c., *Stewart.* SCIND, *Herb. Calcutt.*—DISTRIB. Westward to Egypt and Abyssinia.

Perennial. *Stem* stout at the base, slender and 1–2 ft. high. *Leaves* 3–8 in., convolute, filiform, flexuous, tips capillary. *Panicle* very slender, branches very short, erect, capillary. *Spikelets* pale green or straw-colrd.; gls. I and II not or hardly awned, hairy or glabrous; I ⅓ in.; II rather shorter; III muriculate, callus bearded; awn straight, articulate in the gl., column twisted, plumose as well as the middle branch.

11. **A. plumosa,** *Linn. Sp. Pl. Ed.* II. 1666; stem slender, panicle narrow, branches very short, gls. I and II subequal, III glabrous smooth, awn capillary middle branch 2–3 in. plumose above naked below, lateral much shorter naked of extreme tenuity. *Vahl Symb.* i. 11, t. 3; *Trin. Diss.* i. 181, ii. 26; *in Act. Petrop.* (1829) 89; *Trin. & Rupr. l. c. Ser.* VI. v. (1842) 165; *Kunth Enum. Pl.* i. 195, ii. 151; *Steud. Syn. Gram.* 143; *Aitchis. Cat. Panjab Pl.* 164; *Boiss. Fl. Orient.* v. 495; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 47. A. brachypoda & Forskahlii, *Tausch. in Flora* (1836) 506; *Boiss. l. c.* 495, 496. A. lanata, *Forsk. Fl. Ægypt. Arab.* 25. A. Raddiana, *Savi in Mem. Moden.* (1837) 198; *Steud. l. c.* 144. Arthratherum plumosum, *Nees Fl. Afr. Austr.* i. 182.

WESTERN TIBET; Iskardo, alt. 7700 ft., *Clarke.*—DISTRIB. Turkestan, Persia, N. Africa.

Perennial. *Stem* 1–2 ft., from a stout branching woody stock with stout rigid roots. *Leaves* 2–6 in., rigid, filiform, convolute, flexuous. *Panicle* 2–3 in. (excl. the awns) very narrow. *Spikelets* erect; gls. I and II ½ in., not awned; III callus bearded, column of awn ⅓ in., very slender, hardly twisted, glabrous; middle branch strict, silvery, lower ⅓ naked, lateral about ⅓ in. long.

UNDETERMINABLE SPECIES.

A. RIGNESCENS, *Roem. & Schult. Syst.* ii. 400; *Steud. Syn. Gram.* 141. A. rigida, *Heyne ex Roth. Nov. Sp.* 42 (*non Cav.*); *Kunth Enum. Pl.* i. 197. Arthratherum rigidum, *Schult. Mant.* ii. 212).—May be *A. Hystrix.*

60. **STIPA,** *Linn.*

Tufted perennial grasses. *Leaves* usually convolute. *Spikelets* loosely panicled, terete, 1-fld., rarely dorsally compressed, rachilla forming a thickened or narrow callus below gl. III. *Glumes* 3, I and II empty, persistent, keeled, acute, rarely awned; III rigid, convolute, terete, narrowed into an entire or notched or 2-fid tip, with a long terminal bent usually deciduous awn, column of awn twisted rarely straight; palea 2-nerved, closely embraced by the gl. *Lodicules* 3, large. *Stamens* 1–3, tips of anther-cells bearded or naked. *Grain* narrow, terete, free within but tightly embraced by the gl. and palea.—Sp. about 100, temperate and tropical.

Dr. Stapf has aided me greatly in this difficult genus.

A. Column of awn twisted.

* Awn plumose or hairy throughout its length or nearly so.

1. **S. orientalis,** *Trin. ex Ledeb. Fl. Alt.* i. 83; panicle narrow more or less embraced by the dilated sheath of the uppermost leaf, spikelets ½ in., gls. I and II about twice as long as the silkily hairy III. *Ledeb. Ic. Fl. Ross.* t. 223; *Trin. in Act. Acad. Petersb.* VI. i. (1830) 79; *Kunth Enum. Pl.* i. 185; *Steud. Syn. Gram.* 131; *Boiss. Fl. Orient.* v. 504; *Duthie Grass. N.W. Ind.* 27. S. Semenovii, *Krassn. Descr. Pl. Thiansch. in Script. Bot. Hort. Univ. Petrop.* ii. 22. S. Szovitziana, *Duthie l.c.* 27 (*non Trin.*). S. tartarica, *Jacquem. mss.*

WESTERN TIBET, alt. 10–15,000 ft., *Jacquemont*, &c.—DISTRIB. Westward to Persia. Altai Mts.

Stems 6–14 in., forming dense hard tufts, clothed below with shining sheaths. *Leaves* 4–10 in., filiform, tips long capillary; sheath of uppermost, 4–6 by $\frac{1}{6}$–$\frac{1}{4}$ in. broad. *Panicle* elongate, branches and pedicels short, erect. *Gls.* I and II hyaline, $\frac{1}{3}$–$\frac{1}{2}$ in. long, tips slender; I 1-nerved or 3-nerved at the base; II 3-nerved; III cylindric, callus = about $\frac{1}{6}$ of the gl., bearded; awn plumose throughout its length, nearly straight, column about $\frac{1}{4}$ of its length.—Probably a form of *S. barbata*. Said to be the commonest grass on the Pamir.

2. **S. basi-plumosa,** *Munro mss.*; panicle very narrow, branches and pedicels very short, spikelets purple, gl. I and II $\frac{1}{4}$–$\frac{1}{3}$ in., III about $\frac{1}{3}$ shorter than II sparsely hairy, awn capillary twice or thrice as long as the spikelet very densely bearded towards the base.

WESTERN TIBET; Nubra, and the Lanak Pass, alt. 15–17,000 ft., *Thomson.*

Stems 6–16 in., densely tufted, slender, strict. *Leaves* 4–6 in., convolute, filiform, slightly scabrid. *Panicle* 2–6 in., sometimes sheathed; branches and spikelets distant; gl. I and II ovate-lanceolate finely acuminate, tip and margins white hyaline; I 3-nerved at the base; II 3-nerved; callus of IV = about $\frac{1}{6}$ of the gl.; awn very delicately plumose upwards with spreading hairs, column slightly twisted.

Var. *longe-aristata*, Munro mss.; gl. I and II $\frac{1}{3}$ in., awn 1¼ in.—Western Tibet, *Thomson.*

3. **S. purpurea,** *Griseb. in Goett. Nachr.* (1868) 82; spikelets few purple on long capillary sigmoidly flexuous pedicels, gl. I and II $\frac{2}{3}$–1 in., III about $\frac{1}{3}$ shorter than II softly hairy, awn 2½–3 in. flexuous. S. Richteriana, *Herb. Ind. Or. Hf. T.*; *Duthie Grass. N.W. Ind.* 27 (*not Kar. & Kir.*). Lasiagrostis tremula, *Ruprecht Sert. Thiansch.* 35.

WESTERN TIBET; Gnari Khorsum, alt. 17,000 ft., *Schlagintweit*; Lake Rukshun, 15,000 ft., *Lance.*—DISTRIB. Thianschal Mts., in Central Tibet, alt. 16,000 ft., *Thorold.*

Stems densely tufted, 6–10 in., filiform, sheathed below the panicle. *Leaves* 2–4 in., filiform, convolute; ligule elongate. *Spikelets* very few, hardly forming a panicle, branches and pedicels ½ in. or more, sometimes zigzag. *Gls.* I and II narrowly lanceolate, dark purple with slender hyaline tips; III callus = $\frac{1}{6}$ of the gl., villous. *Anther-tips* naked.

4. **S. mongolica,** *Turcz. ex Trin. in Bull. Sc. Acad. Petersb.* i. (1836) 67; panicle open with few distant widely spreading capillary flexuous branches, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. ovate dorsally compressed, gls. I and II purple below the middle hyaline above it, III hairy, awn about twice as long as the gls. *Steud. Syn. Gram* 132; *Duthie Grass. N.W. Ind.* 27. Lasiagrostis mongholica, *Trin. ex Rupr. in Mem. Acad. Petersb. Ser.* VI. *Sc.*

Nat. v. (1842) 87. L. alpina, *F. Schmidt Reise Amurl.* 73. Ptilagrostis mongholica, *Griseb. in Ledeb. Fl. Ross.* iv. 447, in *Goett. Nachr.* (1868) 82.

ALPINE HIMALAYA; Kumaon, alt. 14,000 ft., *Strachey & Winterbottom.* N. Sikkim, alt. 14–16,000 ft., *J. D. H.* WESTERN TIBET; Ladak, alt. 13,000 ft., *Thomson, Lance.*—DISTRIB. Altai Mts. Mongolia.

Stems 1–2 ft., densely tufted, very slender. *Leaves* 4–6 in., almost capillary, flexuous. *Panicle* 4–6 in., branches solitary, lower 1–3 branching at the ends. *Spikelets* ovoid, pedicels ¼ in.; gls. I and II oblong-lanceolate, acute; I 1-nerved or 3-nerved below; II nerves 3, very slender; III about ⅓ shorter than II, hairy all over; awn twice as long as the spikelets or more, hairy to the tip. *Anther-cells* with bearded tips.

5. **S. concinna,** *Hook. f.*; panicle small few-fld. contracted, branches and pedicels short erect, spikelets ¼ in. ovoid dorsally compressed purple, gls. I and II ovate acute tips hyaline, III glabrous, awn about twice as long as its gl.

SIKKIM HIMALAYA, in the Tibetan Region, alt. 14–16,000 ft., *J. D. H.*

Stem 6–10 in., rather stout. *Leaves* 2–4 in., filiform, flexuous. *Panicle* 1–1½ in., solitary, branches and pedicels erect. *Gl.* I and II acuminate; I 1-nerved II 3-nerved; awn hairy to the tip. *Anther cells* with bearded tips.

**** Awn plumose above the column only.**

6. **S. pennata,** *Linn. Sp. Pl.* 78; panicle narrow sheathed, gl. I and II subequal cuspidately awned, III = ⅓ II glabrous above, awn 6–9 in. flexuous plumose above the column only. *Host Gram. Austr.* iv. 19, t. 33; *Engl. Bot.* t. 1356; *Trin. in Act. Petrop.* (1829) 32; *Trin. & Rupr. l. c.* vii. (1842) 80; *Kunth Enum. Pl.* i. 179; *Reichb. Ic. Fl. Germ.* 46; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 26; *Ledeb. Fl. Ross.* iv 450; *Boiss. Fl. Orient.* v. 502. S. aperta, appendiculata, gallica & tauricola, *Janka ex Celak in Œstr. Bot. Zeitschr* xxxiii. (1883) 317, 319, 349. S. eriocaulis, *Borb. in Œstr. Bot. Zeitschr.* xxxiii. (1883) 401. S. Grafiana, & Tirsa, *Stev. in Bull. Soc. Nat. Mosc.* xxx. ii. 115, 116. S. pulcherrima, *C. Koch in Linnæa,* xxi. (1848) 440.

WESTERN TIBET; Gilgit, alt. 9–10,000 ft., *Giles.*—DISTRIB. Westwd. to the Atlantic. N. Asia.

Stem 2–3 ft., densely tufted. *Leaves* 12–18 in., rigid, convolute, sheaths smooth or rough; ligule oblong. *Panicle* few-fld., branches short. *Spikelets* about 1 in. long; gl. I and II hyaline, tips almost capillary; III hirsute, callus ⅕ in. long; awn twisted and glabrous from the lower third.

***** Awn glabrous or scaberulous, or hairy on the column only.**

† *Tip of gl. III entire.*

7. **S. capillata,** *Linn. Sp. Pl. Ed.* II. 116; panicle very narrow sheathed, spikelets 1 in., gl. II longer than I, III=about ½ II glabrous above, awn 6–8 in. flexuous smooth glabrous throughout. *Host Gram. Austr.* iii. 4, t. 5; *Reichb. Ic. Fl. Germ.* t. 46; *Kunth Enum. Pl.* i. 180, *Suppl.* 133; *Trin. & Rupr. in Act. Petrop. Ser.* VI. v. (1842) 72, t. 55; *Ledeb. Fl. Koss.* iv. 449; *Stend. Syn. Gram.* 130; *Boiss. Fl. Orient.* v. 500. S. capillaris, *Gronov. ex Trautv. in Act. Hort. Petrop.* ix. (1848) 350. S. erecta, *Hort. Madr. ex Trin. Diss.* i. 186, *in Mem. Acad. Petersb.* vi. I. (1829) 81. S. juncea, *Lamk. Illust.* i. 157. S. Lagascae, *Guss. Pl. Rar.* 48, *Fl. Sic.*

Prodr. i. 132 (*ex Bertol.*). S. sareptana, *Beck. in Bull. Soc. Nat. Mosc.* lvii. (1882) 52. S. ukranica, *Steud. Nom. Ed.* I. 816. S. ukranensis, *Lamk. l. c.* S. Varonini, *Krassn. in Script. Bot. Hort. Univ. Petrop.* ii. 22.

WESTERN HIMALAYA; Kashmir, alt. 9–11,000 ft., *Jacquemont*, &c.—DISTRIB. Westwd. to Spain. Dahuria. China.

Stem 2–3 ft., rather stout. *Leaves* 1–2 ft., filiform, convolute, scaberulous; ligule lanceolate. *Panicle* very narrow, more or less enclosed in a sheath, which is 6–10 in. long with a filiform blade often as long as itself; branches and pedicels short. *Spikelets* white, glistening, hyaline, gl. I and II very narrow, with finely acuminate tips; I 5-nerved below; II 5-nerved; III ½ in. long, nerves pubescent below, above and palea quite glabrous; callus nearly half as long as its gl., scabrid, top bearded. *Anther* cells with naked tips.—Dr. Stapf informs me that the N. America *S. comata*, Trin. & Rupr. might be referred here.

8. **S. sibirica**, *Lamk. Illustr.* i. 158; tall, leaves long flat, panicle elongate very narrow branches erect, spikelets ¾–⅓ in. green lanceolate, gls. I and II oblong-lanceolate, III hairy, awn about twice as long as the spikelet rather stout hairy towards the base only. *Kunth Enum. Pl.* i. 185; *Trin. in Act. Petrop.* (1829) 78; *Trin. & Rupr. l. c.* 1842, 59; *Ledeb. Fl. Ross.* iv. 448, *Ic. Fl. Ross.* t. 99; *Steud. Syn. Gram.* 129; *Boiss. Fl. Orient.* v. 499; *Duthie Fodd. Grass. N. Ind.* 27. Avena sibirica, *Linn. Sp. Pl.* 79; *Gmel. Fl. Sibir.* i. t. 12.

WESTERN TEMPERATE HIMALAYA, from Kashmir to Kunawur, alt. 8–9000 ft., *Falconer*, &c.; Black Mts., *Duthie.*—DISTRIB. Affghan. Siberia to Korea.

Stem 2–3 ft., as thick as a duck's quill or more, simple or branched. *Leaves* 1–2 ft. by ⅛–⅓ in., smooth; ligule oblong. *Panicle* 6–12 in., inclined; branches erect and appressed, rarely spreading, scaberulous; pedicels usually shorter than the terete spikelet. *Gls.* I and II subhyaline, III nearly as long as II, terete or slightly dorsally flattened; palea as long as its gl., linear, obtuse, dorsally hairy; callus short, conical. *Anther-tips* bearded.

Var.? *pallida*; very slender, leaves filiform, spikelets ⅕–¼ in. pale, gl. III half as long as II, awn capillary three to four times as long as the spikelet. S. pallida, *Munro ex Duthie Grass. N.W. Ind.* 27 (name). S. sibirica, *Linn. var. Herb. Strachey & Winterbottom.*—Tibet, N. of Kumaon, alt. 15,000 ft., *Strach. & Winterb.*—The specimens are very scanty and want radical leaves.

9. **S. tortilis**, *Desf. Fl. Atlant.* i. 99, t. 31; annual, panicle partially sheathed dense-fld. almost spiciform, spikelets fascicled, gl. I and II subequal much longer than IV setaceously linear, III linear hairy or scabrid, awn 2–4 in. straight column only hairy, callus long acute. *Trin. in Act. Petrop.* (1829) 78, 185, *Trin. & Rupr. l. c.* VI. v. (1842) 64; *Kunth Enum. Pl.* i. 180; *Steud. Syn. Gram.* 130; *Boiss. Fl. Orient.* v. 500. S. capensis, *Nees Fl. Afr. Austr.* i. 170. ?*Thunb. Prodr. Pl. Afr. Austr.* 109. S. humilis, *Brot. Fl. Lusit.* i. 86 (*non Cav.*). S. paleacea, *Sibth. & Sm. Prodr. Fl. Græc.* i. 65; *Fl. Græc.* i. t. 86 (*non Vahl*). S. seminuda, *Vahl ex Hornem. Hort. Hafn.* i. 76.

The PANJAB; Peshawur and Wazuristan, *Stewart.*—DISTRIB. Westwd. to the Atlantic. S. Africa.

Stem very slender, tufted, 4–6 in. *Leaves* filiform. *Panicle* 1–4 in., sheath sometimes ¼ in. broad or more. *Spikelets* ¾–1 in.; gl. I and II 3-nerved; callus of III = ⅕ of the gl. bearded at the top only; column of awn hairy throughout its length. *Anthers* with bearded tips.

†† *Tip of gl. III 2-fid or 2-toothed.*

10. **S. Jacquemontii,** *Jaub. & Spach, Ill. Pl. Or.* iv. 60, t. 639; leaves convolute filiform, panicle narrow rachis and lax-fld. branches filiform, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. linear-lanceolate, gl. I and II subequal lanceolate acuminate, III half as long as II terete villous, awn capillary geniculate 3–4 times as long as the spikelet villous at the base. Lasiagrostis Jacquemontii, *Munro ex Boiss. Fl. Orient.* v. 506.

N. W. Himalaya; Kashmir, Astor, Tilail, &c., alt. 8–9000 ft., *Jacquemont*, &c. Western Tibet; Piti, *Thomson.*—Distrib. Affghanistan.

Stems densely tufted, erect, 10–18 in., very slender. *Leaves* 6–10 in., erect, subflexuous; ligule a very short membrane. *Panicle* 4–6 in. long, erect or slightly inclined, branches erect few-fld. *Spikelets* erect, green or purplish, pedicels rather shorter than the spikelets; gl. I and II 3-nerved; III $\frac{1}{8}$ in., terete, villous all over; tip 2-toothed; awn 1–$1\frac{1}{4}$ in. twisted below the knee; callus very short, conical, villously bearded; palea much shorter than the gl. *Anther-tips* bearded.

11. **S. Duthiei,** *Hook. f.*; tall, very slender, leaves very long and narrow, panicle long narrow few-fld., rachis and long pedicels capillary, spikelets $\frac{1}{3}$–$\frac{1}{2}$ in., very narrow, gl. I and II subequal very narrowly lanceolate, III sparsely hairy, awn capillary nearly straight about twice as long as the spikelet.

Western Himalaya; Garwhal, alt. 12–13,000 ft., *Duthie* (n. 273).

Stem 3–5 ft., tufted. *Leaves* 12–18 in. or more, $\frac{1}{12}$–$\frac{1}{10}$ in. broad, flat, or the lower convolute; ligule large, oblong, obtuse. *Panicle* 8–10 in., branches bearing one or two erect spikelets at the extremity, lower branches 3 in. *Spikelets* pale, glistening; gl. I 3-nerved; II 5-nerved; III about $\frac{1}{3}$ shorter than II, tip minutely 2-fid; awn $\frac{2}{3}$ in., hairy at the twisted base; callus short, conical, oblique, bearded; palea nearly as long as the gl., glabrous. *Anther-tips* bearded.

12. **S. Hookeri,** *Stapf in Journ. Linn. Soc.* xxx. (1894) 121; tall, robust, leaves convolute, panicle oblong loosely branched, branches many-fld., spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. longer than their pedicels, gl. I and II subequal oblong-lanceolate acute minutely scaberulous, IV sparsely hairy or villous, awn about as long as the gl. scaberulous. S. robusta, *Duthie Grass. N.W. Ind.* 27 (*name*). Lasiagrostis robusta, *Munro mss. ex Duthie l.c.* (*name*).

Western Tibet; in wet places, alt. 10–14,000 ft., *Jacquemont*; Nubra, *Thomson.* Tibetan Sikkim, alt. 15–16,000 ft., *J. D. H.*—Distrib. Central Tibet, alt. 14,800 ft., *Thorold.*

Stems 3–4 ft., densely tufted, as thick as a swan's quill at the base, hard, leafy upwards. *Leaves* 1–2 ft., smooth or scaberulous; ligule $\frac{1}{3}$ in., oblong. *Panicle* 3–10 in., inclined; branches 2–4-nate, suberect, and rachis and pedicels smooth. *Spikelets* yellowish or purplish; gl. I broadest, 1–3-nerved; II 3-nerved; III rather shorter than II, terete, 5-nerved; awn more or less curved, slender, hardly twisted towards the base; palea nearly as long as the gl., hairy; callus small, conical, bearded. *Anther-tips* naked or minutely bearded.—In the specimen from Northern Sikkim the stem at the base is as thick as the thumb, the leaves and stems shorter, and panicle sometimes contracted oblong and dense-fld., the short branches crowded, and the spikelets very shortly pedicelled; their gl. III is deeply 2-fid, with equal or unequal setaceous-pointed lobes.

B. Column of awn not twisted. (See also *S. Hookeri.*)

13. **S. splendens,** *Trin. in Spreng. Neue Entdeck.* ii. 54; *Diss.* i. 183, in *Act. Petrop.* (1830) i. 76; tall, robust, leaves convolute, panicle

very large effuse or contracted, spikelets $\frac{1}{6}$ in. sessile or shortly pedicelled, gls. I and II oblong-lanceolate unequal, III tip 2-fid, awn $\frac{1}{4}$–$\frac{1}{3}$ in. *Duthie Grass. N.W. Ind.* 27; *Steud. Syn. Gram.* 132. S. altaica, *Trin. ex Ledeb. Fl. Alt.* i. 80, in *Act. Acad. Petrop.* 1829, 74; *Ledeb. Ic. Fl. Ross.* t. 222; *Kunth Enum. Pl.* i. 184. Lasiagrostis splendens, *Kunth Revis. Gram.* i. 58, *Enum. Pl.* i. 178; *Trin. Sp. Gram. Ic.* 89; *Griseb. in Goett. Nachr.* 82. Agrostis longiaristata, *Herb. Ross. ex Kunth Enum. l. c.*

WESTERN TIBET, alt. 8–12,000 ft., *Falconer*, &c.—DISTRIB. Siberia.

Stem 3–5 ft., as thick as a goose-quill below, yellow, shining; roots very stout, vermiform. *Leaves* 6–12 in., and sheaths smooth or scaberulous, acuminate, lower sheaths long loose; ligule elongate. *Panicle* 12–18 in., pyramidal when open; rachis slender, smooth; branches semi-verticillate, capillary, 4–10 in., simple below, branched above. *Spikelets* white or dull purplish; gl. I and II subacute; I 1-nerved; II longest, 3-nerved, III and palea villous; callus short, conical; awn $\frac{1}{4}$–$\frac{1}{3}$ in., not twisted. *Anther-tips* bearded. *Lodicules* 3, oblong, very minute.—A small state collected in Balti by Schlagintweit and in the Karakoram, alt. 9000 ft. by Clarke, is only 18 in. high, with an open panicle 3–6 in. long, and pale purple spikelets.

14. **S. Orthoraphium,** *Steud. Syn. Gram.* 131; stem slender, leaves flat or convolute, panicle very narrow, branches few erect few-fid., spikelets $\frac{1}{3}$–$\frac{1}{4}$ in., gl. III as long as II sparsely hairy tip entire, awn glabrous with 2 or more deflexed spinules towards the base. Orthoraphium Roylei, *Nees in Proc. Linn. Soc.* i. (1841) 94, *in Ann. & Mag. Nat. Hist.* (1841) 221. —Streptachne? *Wall. Cat.* n. 3795.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 7–11,000 ft., *Wallich*, &c. NAGA HILLS, alt. 10,000 ft., *Clarke.*

Stems densely tufted, 18–24 in. *Leaves* 6–12 in., $\frac{1}{10}$–$\frac{1}{6}$ in. broad, and sheaths quite smooth; ligule short, ciliate. *Panicle* 6–10 in., rachis erect; branches solitary or binate, lower 1–3 in. bearing few distant, narrow, terete, pedicelled spikelets; gls. subequal, 1- or faintly 3-nerved, obtuse or tips sub-dentate; III very narrow, subrostrate; callus short, obconic, bearded; awn 1 in., rather stout, not twisted, nearly smooth, jointed on the gl. but persistent. *Lodicules* 3, large, oblong, obtuse.

DOUBTFUL SPECIES.

S. BREVIFLORA, *Griseb. in Goett. Nachr.* (1868) 82; stems 1–1½ ft., leaves short convolute, ligule short obtuse, panicle narrow base sheathed, branches 1–2-nate distant, gls. I and II linear-lanceolate acuminate, III seriately hairy, awn 2 in., hairs towards its base shorter.—Western Tibet, Gnari Khorsum, *Schlagintweit.* Probably *S. orientalis*, Trin.

61. ORYZOPSIS, *Michx.*

Perennial grasses. *Leaves* flat or convolute. *Spikelets* loosely panicled, ovoid or lanceolate, dorsally compressed, 1-fid. *Glumes* 3, I and II equal or subequal, acute or subrostrately acuminate, very thin; I 5-nerved; II sub 3-nerved; III shorter, coriaceous, articulate by a short broad glabrous basal callus, lanceolate or oblong-lanceolate, more or less pubescent, tip minutely 2-toothed, with a very slender often caducous untwisted awn; palea oblong, coriaceous, as long as the gl., glabrous or hairy. *Lodicules* 2, ovate, thin. *Stamens* 3, anther-tips minutely bearded. *Grain* dorsally compressed, oblong, free within the hardened gl. and palea. —Species about 16, N. temp. regions.

The species are very variable, and great as is dissimilarity between the average states of the following, apparent intermediates between them occur.

1. **O. lateralis,** *Stapf*; very slender, leaves short filiform convolute, panicle very narrow strict, branches short erect few-fld., spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. ovoid subrostrately acuminate, gl. I longer than II, awn of III $\frac{1}{10}$–$\frac{1}{6}$ in. very caducous. Piptatherum laterale, *Munro ex Regel in Act. Hort. Petrop.* vii. (1880) 645; *Aitchis. in Journ. Linn. Soc.* xviii. (1881) 21, 106. P. molinioides, *Boiss. Fl. Orient.* v. 509 (*The Afghan. pl.*). P. soongaricum, *Munro in Herb. Kew.* P. strictum, *Munro in Cat. Pl. Griff. Falcon.*, &c. 56 (*ined.*). Milium laterale, *Regel. l. c.*

Western Himalaya; from Kashmir to Kunawur and Western Tibet, alt. 12–14,000 ft.—Distrib. Affghanist. ?

Stems densely tufted, forming a stout branching base, very slender, smooth. *Leaves* 2–4 in., smooth or nearly so, acuminate, strict or flexuous; ligule oblong, hyaline. *Panicle* 4–10 in., thin, rachis smooth, branches and pedicels scaberulous. *Spikelets* ovoid or ovate-lanceolate, green or tipped with red-purple; gls. I and II subrostrately acuminate, faintly 5-nerved, pair next the midrib arching and anastomosing with the median, outer pair similarly arching the last lower down; II more obscurely 3–5-nerved; III about $\frac{1}{3}$ shorter than II, lanceolate, finely subsilkily pubescent, tip minutely 2-toothed; awn usually very short, very slender, not twisted. *Lodicules* 2, ovate, hyaline. *Anther-cells* minutely bearded. *Grain* oblong.

Var. *effusa*, lower branches of panicle larger $\frac{1}{2}$–1 in. long. O. effusa, *Hack. ex Herb. Duthie.*—Hazara and Baltistan, alt. 9–10,000 ft., *Duthie.* Karakoram, alt. 10,000 ft., *Clarke.*

2. **O. Munroi,** *Stapf*; tall, stem stout or slender, leaves narrow flat, panicle effuse lower branches long many-fld. towards the ends, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. ovoid rostrately acuminate, gls. I and II equal, awn of III $\frac{1}{7}$–$\frac{1}{3}$ in. O. divulsa, *Herb. Clarke.* O. kashmirensis, *Hack. ms. ex Herb. Duthie.* Piptatherum soongaricum, *Duthie in Atkins. Gaz. N.W. Ind.* 626 (*name*). P. holciforme, *Herb. Ind. Or. Hf. & T.*

Western Himalaya; from Kashmir to Garwhal, alt. 7–11,000 ft. Western Tibet; Ladak, Nubra and Zanskar, alt. 10–13,000 ft.—Distrib. Affghan.

Stem 2–4 ft., about as thick as a crow-quill. *Leaves* 4–10 by $\frac{1}{10}$–$\frac{1}{4}$ in., finely acuminate, hardly scaberulous, margins nearly smooth; ligule oblong, hyaline. *Panicle* 6–12 in., branches in distant pairs, filiform, nearly smooth; lower naked for 1–3 in., then branching shortly and bearing shortly pedicelled spikelets. *Spikelets* variable, from ovate to lanceolate; gls. I and II green or tipped with purple or wholly purple; III and its palea pubescent. *Lodicules, stamens* and *grain* as in *lateralis*, but larger.—The larger broader glumes longer awn and great size of the plant distinguish this from var. *effusa* of *lateralis*.

3. **O. æquiglumis,** *Duthie Grass. N.W. Ind.* 27; tall, rather stout, leaves long flat, panicle long effuse or contracted, lower branches long many-fld. towards the ends, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. ovoid acuminate, gl. I and II equal, awn $\frac{1}{7}$–$\frac{1}{3}$ in. ?O. cœrulescens, *Duthie Grass. N.W. Ind.* 28 (*name*). O. Duthiei, *Hack. ex Herb. Duthie.* Piptatherum æquiglume, *Munro ex Duthie in Atkins. Gaz. N.W. Ind.* 626 (*name*).—Pipt. *n.sp. Herb. Strach. & Wint.* n. 2.

Temperate Himalaya; from Kashmir to Sikkim, alt. 6–10,000 ft.

Very closely allied to *O. Munroi*, but usually a stouter plant, and taller, spikelets larger often of a dark or dull green mixed with purple, gls. I and II not so beaked, leaves longer, awn and anthers longer. It may be a state of that plant from moister or warmer localities. I have seen no specimen of *O. cœrulescens*, Duthie, which was collected at Gungotri, alt. 9–10,000 ft.

62. **MILIUM,** *Linn.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* loosely panicled, not jointed on their pedicels, ovate, dorsally compressed, 1-fld., rachilla not produced. *Glumes* 3, I and II subequal, thin, 3-nerved, persistent; III oblong or obovoid, dorsally compressed, coriaceous, shining, not awned; callus very short, broad, naked; palea 2-nerved. *Lodicules* 2. *Stamens* 3. *Styles* short, free. *Grain* ovoid or oblong, free within the gl. and palea.—Species 5 or 6, N. temp. regions.

M. effusum, *Linn. Sp. Pl.* 61; perennial, panicle effuse, spikelets glabrous. *Fl. Dan.* t. 1143; *Host Gram. Austr.* iii. t. 22; *Engl. Bot.* t. 1106; *Knapp Gram. Britt.* t. 19; *Kunth Enum. Pl.* i. 66, *Suppl.* 44, t. 10, f. 1; *Reichb. Ic. Fl. Germ.* t. 45, vii. t. 73; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 17; *Steud. Syn. Gram.* 34; *Ledeb. Fl. Ross.* iv. 510; *Aitch. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 28. M. ascendens, *Roxb. Hort. Beng.* 8 (*name*). M. dubium, *Jacquem. mss.* Agrostis effusa, *Lamk. Encycl.* i. 159.

Western Himalaya, alt. 7–11,000 ft., from Kashmir, *Jacquemont*, &c., to Kumaon, *Strachey & Winterb.*—Distrib. N. Temp. and Arctic regions.

Perennial. *Stem* 2–4 ft., erect, smooth, shining, leafy. *Leaves* 6–12 by $\frac{1}{6}$–$\frac{1}{2}$ in. acute, minutely, scaberulous or smooth above; ligule oblong, truncate, torn. *Panicle* 5–10 in., close or effuse; branches capillary, fascicled or subverticillate, naked below, at length spreading or deflexed. *Spikelets* $\frac{1}{8}$ in., green.

DOUBTFUL INDIAN SPECIES.

M. phleoides, *Sweet, Hort. Brit. Ed.* 2, 555.

63. **HELEOCHLOA,** *Host.*

Rigid annual or perennial erect or prostrate grasses. *Leaves* flat or convolute. *Spikelets* 1-fld., densely imbricate in cylindric spikes or spiciform panicles, laterally compressed; rachilla not produced above gl. III. *Glumes* 3, hyaline, I and II subequal or I shorter, keeled, 1-nerved, persistent; III = II or longer, lanceolate or oblong, 1-nerved; palea oblong, obtuse or 2-fid, 2-nerved. *Lodicules* 2 (or 0?). *Stamens* 2 or 3. *Styles* elongate. *Grain* ovoid, loose in the gl. and palea.—Species few, Oriental.

Crypsis aculeata, Ait., a grass resembling *Hel. schoenoides* in habit, but with capitate spikelets, is recorded as Indian by Aitchison (*Cat. Panjab. Pl.* 157), Boissier (*Fl. Orient.* v. 475) and other works, but no doubt by mistake for *Heleochloa schoenoides*. I have seen no specimen of *Crypsis*, which is an Eastern and Siberian plant from India, or even from Affghanistan.

1. **H. schoenoides,** *Host Gram. Austr.* i. 23, t. 30; annual, stems compressed prostrate spreading in a circle from the root, panicle ovoid-oblong sessile on the greatly dilated sheath of the uppermost leaf. *Boiss. Fl. Orient.* v. 476; *Duthie Fodd. Grass. N. Ind.* 48. Crypsis aculeata, *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 45, t. 62. C. schoenoides, *Lamk. Illust.* i. 166, t. 42, f. 1; *Kunth Enum. Pl.* i. 22, *Suppl.* 17, t. 5, f. 1; *Ledeb. Fl. Ross.* iv. 459; *Steud. Syn. Gram.* 152; *Duthie Grass. N.W. Ind.* 25. C. compacta, *Steud. l. c.* 151. C. nilaica, *Fresen. & Notar. in Mem. Acad. Tor. Ser.* II. xiv. (1854) 322. C. vaginiflora, *Opiz Natural.* viii. (1824) 83; *Steud. l. c.* 152. Phalaris vaginiflora, *Forsk. Fl. Ægypt. Arab.*

18. Phleum schœnoides, *Linn. Sp. Pl.* 60; *Jacq. Fl. Austr. v. App.* 29 t. 7 *Ic.* i. 2 t. 15; *Cav. Ic.* i. t. 52, f. 5. Spartina phleoides, *Roth. Neue Beytrag.* i. 101. Pechea sub-cylindrica, *Pourr. Chlor. Narbon.* n. 103.

The PANJAB, WESTERN HIMALAYA, and WESTERN TIBET; Kashmir, *Jacquemont.* Iskardo, alt. 7000 ft., *Thomson.* BANDULKUND, *Duthie.* ? SIKKIM; at Dorjiling, *Herb. Griffith.*—DISTRIB. Westward to the Atlantic.

Glaucous. *Stems* many, 1–10 in., prostrate with ascending tips, leafy, rigid. *Leaves* 1–2 in., narrowly lanceolate, acuminate; sheaths deeply furrowed, margins glabrous or ciliate; ligule a short ring of hairs. *Panicle* ½–2 in. by ¼–⅓ in. diam., green. *Spikelets* ⅛ in.; gl. all 1-nerved, keels ciliate; I and II narrowly lanceolate, acuminate; I shortest; III ovate-lanceolate, acuminate; palea oblong, truncate, nerveless. *Lodicules* 2, oblique, cuneate. *Stamens* 2–3, filament very long; anthers small.—The Bandulkund specimens are very small and pale, almost silvery white, with very small spikes hardly emerging from the leaf-sheath. The Sikkim habitat is probably due to a misplaced ticket.

2. **H. dura,** *Boiss. Fl. Orient.* v. 477; perennial, minutely pubescent, stem stout ascending, leaves involute pungent, panicle elongate cylindric narrow. H. alopecuroides, *Duthie Fodd. Grass. N. Ind.* 48 (*non Boiss.*). Crypsis dura, *Boiss. Diagn. Ser.* II. iv. 125. C. phalaroides, *Duthie Grass. N.W. Ind.* 25 (*non M. Bieb.*). Vilfa setulosa, *Trin. in Mem. Acad. Petersb. Ser.* VI. v. ii. (1840) 55; *Steud. Syn. Gram.* 154.

SCIND, *Stocks*, in salt water.—DISTRIB. Arabia.

Whole plant pale, and clothed with a very fine velvety pubescence. *Stems* 6–10 in., densely fastigiate from a woody inclined base which is clothed with leaf-sheaths, ascending, stout, as thick as a crow-quill, hard, few-leaved. *Leaves* 3–6 in., quite terete, rigid, pungent; sheaths short, coriaceous; ligule 0. *Spikes* 2–4 in. by ⅙–¼ in. diam. *Spikelets* $\frac{1}{12}$ in., membranous, gl. all 1-nerved and with ciliate keels, I and II narrowly oblanceolate, acuminate; III half as long again, oblong, mucronate; palea oblong, bifid, 2-nerved, lobes obtuse ciliate. *Lodicules* 2, obliquely cuneate, acute. *Stamens* 2; filaments very long; anthers short. *Ovary* ovoid; styles very long, slender.—Boissier cites Griffith by error, for Stocks, under the habitat of Scind.

64. **PHLEUM,** *Linn.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-fld., with rarely a rudimentary 2, imbricated on cylindric or oblong spiciform panicles, strongly laterally compressed, not jointed on the very short pedicels; rachilla sometimes produced beyond gl. III. *Glumes* 3, I and II equal, keeled, awned or mucronate; III much smaller, hyaline, awned or not, 3–5-nerved, toothed; palea small. *Lodicules* 2. *Stamens* 3. *Ovary* glabrous; styles long. *Grain* compressed, free within the gl. and palea.—Species about 10, temp. and Arctic.

Phleum pratense, Linn. (Timothy grass) is mentioned by Royle (Ill. Bot. Himal. 417, and Duthie Grass. N.W. Ind. 28) as a native of the N.W. Himalaya (Urukta & Chur), but this has never been confirmed.

1. **P. alpinum,** *Linn. Sp. Pl.* 59; perennial, upper sheaths inflated, panicle ovoid or oblong, gl. I and II truncate as long as their awns keels hispid, III 3-nerved. *Fl. Dan.* t. 213; *Host Gram. Austr.* iii. t. 10; *Kunth Enum. Pl.* i. 29; *Trin. Sp. Gram. Ic.* t. 21; *Engl. Bot.* t. 519; *Knapp Gram. Brit.* t. 7; *Reichb. Ic. Fl. Germ.* t. 50; *Ledeb. Fl. Ross.* iv. 458; *Steud. Syn. Gram.* 150; *Boiss. Fl. Orient.* v. 484; *Wall. Cat.* n. 3779; *Duthie Grass. N.W. Ind.* 28. P. Hænkeanum, *Presl Rel. Hænk.* i. 245;

Steud. l. c. 150. P. nigricans, *Willd. ex Trin. in Mem. Acad. Petersb. Ser.* VI. v. II (1840) 123. P. ovatum, *Jacquem. mss.*

Temperate and Subalpine HIMALAYA, alt. 10–13,000 ft., from Kashmir eastwards, in wet places.—DISTRIB. Arctic and Alpine regions. Fuegia.

Stem solitary, 6–18 in., ascending from a creeping base, smooth, stiff. *Leaves* short, spreading; ligule short. *Panicle* $\frac{1}{3}$–$1\frac{1}{2}$ in., green or purplish; gl. I and II $\frac{1}{6}$ in. with the awn.

2. **P. arenarium**, *Linn. Sp. Pl.* 60; annual, upper sheaths inflated, panicle cylindric or oblong narrowed at the base, gl. I and II lanceolate finely acuminate hardly awned keels ciliated above, III very small hairy. *Fl. Dan.* t. 915; *Kunth Enum. Pl.* i. 28; *Reichb. Ic. Fl. Germ.* t. 50; *Ledeb. Fl. Ross.* iv. 456; *Steud. Syn. Gram.* 151; *Boiss. Fl. Orient.* v. 481; *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 28. P. ramosum, *Gilib. Exercit.* ii. 519. Phalaris arenaria, *Willd. Sp. Pl.* i. 328; *Engl. Bot.* t. 222; *Knapp Gram. Britt.* t. 4. Crypsis arenaria, *Desf. Fl. Atlant.* i. 63. Chilochloa arenaria, *Beauv. Agrost.* 37. Achnodon arenarius, *Link Enum. Hort. Berol.* i. 65. Achnodonton arenarium, *Trin. Diss.* i. 166.

The PANJAB and WESTERN HIMALAYA; in Kashmir and Kishtwar, ascending to 9000 ft., *Jacquemont*, &c.—DISTRIB. Westward to the Atlantic.

Stems 6–14 in., tufted, glabrous, leafy. *Leaves* flat, sheaths smooth; ligule elongate, oblong. *Panicle* 1–$2\frac{1}{2}$ by $\frac{1}{3}$–$\frac{2}{3}$ in., glaucous, sometimes lobed. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., rachilla produced beyond gl. III; gls. I and II punctulate; III 3-nerved.—Var. *Thomsonii*, Griseb. in Goett. Nachr. (1868) 83. I find no character whereby to distinguish this from the common form.

3. **P. asperum**, *Jacq. Collectan.* i. 110, *Ic. Rar.* t. 14; annual, panicle long slender cylindric, gl. I and II cuneately obovate truncate cuspidate, keels scabrid above, III oblong obtuse pubescent. *Vill. Fl. Delph.* ii. 61, t. 2, f. 4; *Kunth Enum. Pl.* i. 28; *Steud. Syn. Gram.* 151; *Boiss. Fl. Orient.* v. 481; *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 28. P. viride, *All. Fl. Pedem.* ii. 232. P. paniculatum, *Huds. Fl. Angl.* 23 (*excl. Syn.*); *Engl. Bot.* t. 1077; *Knapp Gram. Britt.* t. 8. P. ventricosum, *Moench Meth.* 177. P. viride, *All. l.c.* Phalaris aspera, *Retz. Obs.* iv. 14; *Host Gram. Austr.* ii. t. 37. Phal. paniculata, *Ait. Hort. Kew*, i. 87. Chilochloa aspera, *Beauv. Agrost.* 37; *Reichb. Ic. Fl. Germ.* t. 51.

The PANJAB HIMALAYA, *Royle*, &c. KUNAWUR (*Herb. Munro*). KASHMIR, alt. 5–6000 ft., *Jacquemont*, &c. The SALT RANGE, *Aitchison*.—DISTRIB. Westward to the Atlantic.

Stem 6–18 in, tufted, stout, rigid. *Leaves* broad, margins scabrid. *Panicle* 1–$4\frac{1}{2}$ by $\frac{1}{4}$–$\frac{1}{3}$ in. diam. *Spikelets* green, $\frac{1}{12}$–$\frac{1}{8}$ in.; gl. I and II rigid, glabrous or scabrid, the sinus between them rounded, 3-nerved, dilated above with gibbous membranous margins, III membranous = $\frac{2}{3}$ of I and II.—Scent of *Anthoxanthum.*

65. ALOPECURUS, *Linn.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-fld., strongly laterally compressed, imbricating in a cylindric or oblong spiciform panicle, jointed on the tumid tip of the very short pedicels, rachilla not produced beyond gl. III. *Glumes* 3, I and II subequal, strongly compressed, keeled, often connate by their margins below; III as long as I and II, hyaline, convolute, with usually a basal or median dorsal awn; palea 0 (in Indian sp.). *Lodicules* 0. *Stamens* 2 or 3. *Ovary* glabrous. *Grain* laterally compressed, free.—Species about 20, temp. and cold regions.

* *Perennials. Panicle ovoid or oblong.*

1. **A. himalaicus,** *Hook. f.*: upper leaf-sheaths inflated, panicle oblong or subcapitate, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in., gls. I and II lanceolate subaristately acuminate hirsute with spreading hairs longer than the spikelet is broad, III much shorter than I and II, awn twice as long as the spikelet or more.

KASHMIR and DRAS, alt. 10–14,500 ft., *Falconer*, &c.

Stem 6–18 in., subsolitary, erect from a creeping base, rather stout. *Leaves* 3–5 in., erect or spreading, upper shorter lanceolate acuminate; upper sheaths 3–5 in., ower appressed; ligule large, scarious, toothed. *Panicle* 1–1½ in., grey-green or purplish. *Spikelets* membranous, hairs flaccid; gls. I and II connate below, tips dark; III ¼ shorter than I or II, obtuse, apiculate.—Most nearly allied to *A. phalaroides*, Schur, of Hungary, which is hardly distinguishable from *A. brachystachyus*, Bieb., of Siberia; but the spikelets of *A. himalaicus* are much larger than in those species, from which its acuminate gls. I and II and short III at once distinguish it.

2. **A. arundinaceus,** *Poir. Encycl.* viii. 766; rootstock creeping, panicle cylindric, spikelets $\frac{1}{5}$ in., gl. I and II connate below acute keel ciliate with long hairs, awn short. *Boiss. Fl. Orient.* v. 487; *Steud. Syn. Gram.* 150. A. altissimus, *Schur in Œstr. Bot. Zeitschr.* ix. (1859) 13. A. elatior, *Jacquem. mss.* A. muticus, *Kar. & Kir. in Bull. Soc. Nat. Mosc.* xv. (1842) 527; *Steud. l. c.* 148. A. nigrescens, *Jacq. Eclog. Gram.* ii. t. 13. A. nigricans, *Hornem. Hort. Hafn.* i. 68; *Kunth Enum. Pl.* i. 24. A. pratensis, *Aitchis. Cat. Panjab Pl.* 158; *Duthie Grass. N.W. Ind.* 26, *Fodd. Grass. N. Ind.* 46 (*non Linn.*). A. pratensis, *var.* ruthenicus, *Trin. Sp. Gram. Ic.* t. 45. A. repens, *Bieb. Fl. Taur. Cauc.* iii. 54. A. ruthenicus, *Weinm. in Fl. Dan.* t. 2881. A. sibiricus, *Hort. Vind. ex Roem. & Sch. Syst.* ii. 271. A. ventricosus, *Pers. Syn.* i. 80.

WESTERN HIMALAYA, alt. 8–12,000 ft., from Kashmir to Garwhal.—DISTRIB. Westward to Europe, N. Asia.

Stem 2–4 ft., erect, slender. *Leaves* 6–10 in., acuminate; upper sheaths slightly inflated, 4–6 in. long; ligule rounded. *Panicle* 1–3 in. by ¼–⅓ in. diam., green, soft. *Spikelets* subsilky; gl. I and II lanceolate, acuminate, more or less connate at the base or to above it; III acute, tip scaberulous; awn subbasal.—I doubt this being more than a form of *A. pratensis*, L.

** *Annuals or subperennials. Panicle cylindric.*

3. **A. aristulatus,** *Michx. Fl. Bor. Am.* i. 43; stems slender geniculately ascending, leaves glaucous, panicle slender, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. oblong, gls. I and II hyaline obtuse softly ciliate, III truncate, awn median-dorsal short, anthers oblong bright yellow. A. fulvus, *Sm. Engl. Bot.* t. 1467; *Fl. Dan.* t. 1804; *Kunth Enum. Pl.* i. 24; *Reichb. Ic. Fl. Germ.* t. 49; *Ledeb. Fl. Ross.* iv. 464; *Boiss. Fl. Orient.* v. 487; *Steud. Syn. Gram.* 407. A. geniculatus, *Poll. Hist. Pl. Pal.* n. 66; *Host Gram. Austr.* ii. t. 32 (*non Linn.*). A. paludosus, *Beauv. ex Mert. & Koch. Fl. Germ.* i. 481. A. subaristatus, *Pursh. Fl. Am. Sept.* i. 66.

WESTERN HIMALAYA; Kashmir, in marshes, alt. 6–14,000 ft., *Clarke*, *Duthie*.—DISTRIB. Europe, N. Asia, N. America.

Stem 6–18 in., creeping below, flaccid. *Leaves* 4–8 in., linear, flat; upper sheaths somewhat inflated; ligule elongate. *Panicle* 1–2 in. by $\frac{1}{6}$ $\frac{1}{4}$ in. diam., green. *Gls.* I and II free or connate at the very base, elliptic, obtuse.—Regarded by various authors as a variety of *A. geniculatus*, L.

4. **A. geniculatus,** *Linn. Sp. Pl.* 60; stems erect or geniculate below, leaves not glaucous, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. oblong, gls. I and II connate at or above the base subacute or obtuse hyaline ciliate, III truncate, awn subbasal, anthers linear orange-yellow. *Engl. Bot.* t. 1250; *Knapp Gram. Brit.* t. 18; *Kunth Enum. Pl.* i. 24, *Suppl.* 18, t. 7, f. 1; *Trin. Sp. Gram. Ic.* t. 42; *Steud. Syn. Gram.* 147; *Aitchis. Cat. Panjab Pl.* 157; *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 46; *Benth. Fl. Hongk.* 408, *Fl. Austral.* vii. 555. A. australis, *Nees in Hook. Journ. Bot.* ii. (1843) 412; *Steud. l. c.* 148. ? A. diandrus, *Griff. Notul.* iii. 11, *Ic. Pl. Asiat.* t. 142, f. 2. A. paniceus, *O. Muell. in Fl. Dan.* t. 861. A. ramosus, *Poir. Encycl.* viii. 776; *Steud. l. c.* 146.—Alopecurus, *Wall. Cat.* n. 3780 C.

Temperate and Subtropical HIMALAYA, alt. 3–7000 ft., from Kashmir to Bhotan. ? Assam, *Griffith.*—DISTRIB. Most temp. regions.

Stems 6–18 in., stout or slender. *Leaves* $\frac{1}{8}$–$\frac{1}{6}$ in. broad; upper sheaths more or less inflated; ligule oblong. *Panicle* 1–3 in. by $\frac{1}{4}$–$\frac{1}{3}$ in. diam., greenish-yellow. *Spikelets* larger than in *A. aristulatus*, not so membranous; gl. III with the truncate tip sub-erose. *Stamens* 2 or 3.—Of Griffith's *A. diandrus*, there are under the same number (Kew distrib. 2693) slender narrow-leaved specimens from Rydang in Bhotan, quite like the western Indian plant, but also a much larger one from the sandy banks of the Burrampooter in Assam, with many stout stems from the root, much broader leaves, with more ventricose upper sheaths, and rather stouter panicles (it is n. 6463 Kew distrib.). Griffith, in his Itinerary Notes (158, n. 801, and Notulæ l. c.), says the stems and young sheaths are glaucous, and he figures the anthers as oblong and yellow, which are characters of *aristulatus*; but the habit and spikes are those of *geniculatus*. It may prove to be a distinct species.

5. **A. agrestis,** *Linn. Sp. Pl. Ed.* II. 89; stem erect or geniculate below, spikelets $\frac{1}{5}$ in. gl. I. and II. connate to or below the middle obtuse, keels narrowly winged, III narrowly oblong tip truncate, awn subbasal twice as long as the spikelet recurved. *Fl. Dan.* t. 697; *Host Gram. Austr.* iii. t. 12; *Engl. Bot.* t. 848; *Knapp Gram. Brit.* t. 16; *Kunth Enum. Pl.* i. 23; *Trin. Sp. Gram. Ic.* t. 37; *Reichb. Ic. Fl. Germ.* t. 19; *Ledeb. Fl. Ross.* iv. 465; *Steud. Syn. Gram.* 149; *Boiss. Fl. Orient.* v. 485; *Duthie Grass. N.W. Ind.* 25, *Fodd. Grass. N. Ind.* 46; *Benth. Fl. Hongk.* 407, *Fl. Austral.* vii. 555. A. myosuroides, *Huds. Fl. Angl.* 23.

Temperate and Subtropical HIMALAYA; Kashmir, &c. The PANJAB. KHASIA HILLS, alt. 3000 ft., *Clarke.* MUNNEPORE, alt. 3000 ft., *Watt.*—DISTRIB. Europe. W. and N. Asia. Introd. elsewhere.

Stem 6–10 in., or more. *Leaves* scaberulous, upper sheaths slightly inflated; ligule oblong. *Panicle* 1–3 in. by $\frac{1}{6}$–$\frac{1}{5}$ in. diam., pale green. *Spikelets* loosely imbricate, rather narrow, glabrous except the keels of gl. I and II; gl. III narrowly oblong, truncate, tip toothed; awn rather stout. *Anthers* long, narrow.—Possibly not indigenous in India. Watt describes it as found in rice-fields in Munnepore.

6. **A. nepalensis,** *Trin. ex Steud. Syn. Gram.* 148; stem erect or geniculately ascending, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. obovate, gl. I and II connate to the middle subacute keels narrowly winged scabrid, III narrowly oblong, tip truncate exserted, awn subbasal very short or 0.—A. navicularis, *Ham. ex Wall. Cat.* n. 3780 A.—Alopecurus, *Wall. Cat. l. c.* A. B.

UPPER GANGETIC PLAIN; Oude, *Hamilton.* The PANJAB; Lahore, *Thomson*; Garwhal, *Jacquemont.*

Perhaps only a form of *A. agrestis*, which it closely resembles, but the spikelets are much smaller and very closely imbricate, less contracted at the base, and the keel of the glume is not ciliate. *Stamens* 3, anthers long.

66. **PHIPPSIA,** *Br.*

Very small perennial grasses. *Leaves* narrow. *Spikelets* minute, laterally compressed, in sparingly branched subspiciform panicles, not jointed on their pedicels; rachilla not produced beyond gl. III. *Glumes* 3, membranous, all persistent, I and II very short, obtuse, nerveless; III terminating the stipitiform rachilla, oblong, obtuse or tip rounded, nerves 0 or 1–3; palea as long or longer than the gl., tip 2-fid, nerves very faint. *Lodicules* 2, hyaline. *Stamens* 1–3. *Styles* very short, free, plumose to the base. *Grain* oblong, loose.—Species 2, an Arctic and the following.

This genus should perhaps be placed near to *Colpodium*.

P. himalaica, *Hook. f.*; palea much longer than its gl.

Alpine Western Himalaya; Kumaon, Barji-Khang Pass, alt. 14,500 ft., *Strachey & Winterbottom*; Garwhal, on the Duder Glacier, alt. 13–14,000 ft., *Duthie*.

Densely tufted, 6–8 in. high, very slender. *Leaves* 2–4 by $\frac{1}{16}$ in., linear, obtuse; ligule long. *Panicle* 1-1½ in., sometimes almost reduced to a spike; rachis slender, smooth; branches very few, short, erect and appressed to the rachis, bearing 2–3 spikelets. *Spikelets* $\frac{1}{10}$ in. long, pale brown; gl. I shortest, ovate, obtuse; II almost orbicular, concave, = about ¼ III, nerveless, tip rounded; III raised on a short cylindric naked rachilla, concave, obtuse, nerveless, sparsely hairy on the back towards the base; palea longer than the gl. and nearly as broad, concave, tip 2-fid, keels ciliate. *Lodicules* 2, ovate-lanceolate. *Stamen* 1, filament very long; anther nearly as large as gl. III. *Ovary* narrow; stigmas broadly plumose.—Differs from the Arctic *P. algida*, in the much narrower leaves, in the fewer very shortly pedicelled larger spikelets not crowded on lateral branches, in the narrower gl. III, long palea, very large anther, broadly plumose stigmas, and long ligule.

67. **CYATHOPUS,** *Stapf.*

A slender perennial grass. *Leaves* flat. *Spikelets* 1-fld., very small, subterete, singly pedicelled on the branches of a decompound narrow panicle, articulate on the cupular tip of the pedicel, rachilla not produced beyond the flg. gl. *Glumes* 3, I and II subequal, oblong, beaked, persistent, strongly 3-nerved; III rather shorter, membranous, obtuse, 5-nerved below the middle; palea lanceolate, acute, keels smooth. *Lodicules* 2, ovate-lanceolate. *Stamens* 3, anthers short. *Styles* distinct, stigmas short.

C. sikkimensis, *Stapf in Hook. Ic. Pl.* t. 2395. Hymenachne, n. 3. *Herb. Ind. Or. Hf. & T.* Milium Treutleri, *Kuntze Rev. Gen. Pl.* 780 (*in part*).

Sikkim Himalaya; Lachoong Valley, alt. 7–10,000 ft., *J. D. H.*

Stem 2–3 ft. high, from a creeping stoloniferous base. *Leaves* 6–10 by $\frac{1}{6}$–$\frac{1}{4}$ in., finely acuminate, many-nerved, scaberulous, margins thickened smooth; sheaths deeply striate; ligule elongate, scarious. *Panicle* 8–12 in., oblong, or pyramidal; rachis and branches flexuous, terete, scaberulous; branches fascicled or subverticillate, lower 2–4 in. long, naked below. *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in., scaberulous, shortly pedicelled, pale green; gls. I and II stoutly subaristately beaked, scaberulous; nerves scabrid; III oblong, nerves slender; callus obconical; palea linear-oblong, 2-nerved. *Anthers* and stigmas short.—Munro regarded this very distinct grass as forming a new genus near the *Hymenachne* section of *Panicum*. Dr. Stapf has, I think, rightly referred it to near *Garnotia*.

67[1]. **WOODROWIA,** *Stapf.*

(Genus not in *Clavis*, p. 7.)

Annual. *Leaves* narrow, flat. *Spikelets* 2–5, 1-fld., subdigitately panicled at the top of a slender peduncle, articulate on a fragile rachis, laterally compressed, rachilla not produced beyond the flg. gl. *Glumes* 3, I and II strongly laterally compressed, empty, acute, dorsally rounded and there sometimes much thickened, 1-nerved, I $\frac{1}{3}$ longer than II; III = II, hyaline, 1-nerved, 2-lobed with a slender interposed geniculate awn; palea obovate-oblong, hyaline. *Lodicules* 2, cuneate, lobulate. *Stamens* 2, anthers linear. *Styles* free and stigmas very slender. *Grain* slender, cylindric, free within the gls.

W. diandra, *Stapf in Hook. Ic. Pl.* t. 2447.

The DECCAN; Poonah District, *Woodrow.*

Stem 12–18 in., slender, branched, nodes hairy. *Leaves* 3–4 by $\frac{1}{12}$–$\frac{1}{6}$ in., acuminate, hirsute, margins scabrid; sheaths appressed, glabrous or hairy at the mouth; ligule short, ciliolate. *Spikes* 1–2 in., rachis slender, hairy. *Spikelets* rather distant, $\frac{1}{4}$ in. long, green or blueish; gl. I dorsally hairy, margins ciliolate; keel of II densely ciliate; awn of III 1 in., column shorter than the upper part, spirally ciliate.—This interesting plant arrived at Kew after the printing of the key, p. 7.

68. **GARNOTIA,** *Brongn.*

Erect, perennial rarely annual grasses. *Leaves* flat or convolute. *Spikelets* very small, 1-fld., panicled, solitary or geminate, jointed on the pedicels, narrowly-lanceolate; rachilla not produced beyond the fl. gl. *Glumes* 3, I and II empty, subequal, 3-nerved, acuminate, equalling or longer than III, awned or not; III bisexual, 1–3-nerved, triandrous, very narrow, terete, tip acuminate or notched, awned, rarely awnless or 3-awned; awn straight or base twisted, rarely geniculate or recurved; sides of palea auricled at the base. *Lodicules* 2. *Styles* free. *Grain* linear or oblong, free.—Species about 20, Asiatic and Polynesian.

In the disposition and description of the species I have been aided by Dr. Stapf, who has drawn up an account of the whole genus.

A. *Stems* densely tufted, uppermost internode exceeding the rest of the stem. *Leaves* long, stiff, erect, not articulate on the sheath; basal sheaths equitant, flattened.

* Leaves narrow, complicate (triangular on section); margins of lower sheaths woolly, at length glabrate.

† *Awn of gl. III reflexed from the twisted base.*

1. **G. Thwaitesii,** *Stapf. mss.*; stem very tall stout, panicle 1–2 ft. much branched, branches long slender, spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. base shortly hairy, gl. I and II acuminate or shortly awned. G. scoparia, *Thwaites Enum. Pl. Zeyl.* 363; *Trim. Cat. Ceyl. Pl.* 106. Berghausia scoparia, *Munro ex Thw. l. c.*

CEYLON; hotter parts of the island, *Thwaites.*

Stem 2–4 ft. and more, often as thick as a goose-quill below, compressed. *Leaves* 1–3 ft., about $\frac{1}{6}$ in. broad, wiry; lower sheaths strongly compressed and keeled, margins above woolly; ligule very short, ciliate. *Panicle* very variable in length

and breadth, copiously effuse. *Gl.* I and II entire or notched with a short awn in the notch; III tip notched or entire, awn rarely twice as long as its gl.—Steudel refers Koenig's *Agrostis scoparia* to *Arundinella nervosa*, Nees. A specimen so named in Rottler's Herbarium is a grass 10 ft. high with flat leaves $\frac{2}{3}$ in. broad and panicle $2\frac{1}{2}$ ft. long, the spikelets have all fallen away. It is probably *Thysanolæna*.

†† *Awn not reflexed from the twisted base, bent above, O in G. tectorum.*

2. **G. Schmidii**, *Hook. f.*; stem 1–3 ft. simple or branched above, leaves very narrow flexuous, panicle 6–10 in. narrow, spikelets $\frac{1}{5}$ in. pale or dark brown, base bearded, glumes I and II notched and awned, III nearly as long as I notched, awn twice as long as the glume.

Nilghiri Hills, *Schmid*; Gondaloor Ghat, alt. 4500 ft., *Lawson*.

Stems tufted, base with the distichous leaf-sheaths an inch broad. *Leaves* $\frac{1}{12}$ in. broad, shorter than the peduncle. *Panicle* erect, branches 1–$1\frac{1}{2}$ in., erect.—Schmid's specimens are small, 1 ft. high with a rather loose panicle and almost red-brown spikelets. Lawson's is a very much larger plant with longer leaves and denser panicle and paler spikelets.

3. **G. tenuiglumis**, *Stapf. mss.*; stem tall stout, leaves very narrow, panicle 2 ft. very narrow, spikelets $\frac{1}{8}$ in., base nearly glabrous, glumes thin, II 1-nerved, awn of III short capillary base twice or thrice twisted. Chrysopogon muricatus, *Herb. Wight*, n. 3247.

Western Peninsula, *Wight*.

Stem 3–4 ft., as stout as a goose-quill, solid, upper internode 10–16 in. *Leaves* 12–16 in., exceeding the stem, glabrous except towards the very base; sheaths subcompressed, margins above woolly; ligule a ridge of hairs. *Panicle* strict, rachis stout, terete; branches 2–3 in., filiform, in distant clusters, strict, erect. *Spikelets* pale yellow-brown, appressed to the branchlets; gl. I aristulate; II subhyaline; awn of III rather longer than the spikelets.

4. **G. scoparia**, *Stapf. mss.*; stem 3 ft., leaves very narrow plicate or keeled, panicle 16–20 in. long narrow branches very long, spikelets $\frac{1}{6}$ in. base shortly bearded, glumes firm, II 3-nerved, awn of III about as long as the spikelet, base twisted. Berghausia scoparia, *Munro in Herb. Ind. Or. H.f. & T.* B. elata, *Arn. ex Miq. Analect. Bot.* ii. 20. Miquelia elata, *Arn. ex Nees in Wight Cat.* n. 2600, *ex Miq. l.c.* Agrostis scoparia, *Koen.* et Aristida arundinacea, *ex Wall. Cat. n.* 8912 A. A. laxa et Aristida montana, *Herb. Rottl. ex Wall.* 8912 B.—Gramin. *Wall. Cat.* n. 8912.

Mysore; at Chitaldrug, *Heyne*; Mysore & Kurg, *G. Thomson*.

Stem nearly as thick as a goose-quill below. *Leaves* erect, very narrow, glabrous or margins towards the base hairy; sheath with woolly margins; ligule a ridge of hairs. *Panicle* very narrow, branches 6–8 in., filiform, erect. *Spikelets* pale yellow; gl. I and II subsimilar, I subaristately acuminate, III 2-dentate, awn geniculate.

5. **G. tectorum**, *Hook. f.*; stem very tall stout, leaves long $\frac{1}{2}$ in. broad, panicle 1–2 ft. narrowly oblong branches lax-fld. at length spreading, spikelets $\frac{1}{6}$ in. base obscurely pubescent, gl. all subequal acuminate or mucronate not awned. G. stricta, *Thw. Enum. Pl. Zeyl.* 363 (*excl. Syn.*); *Trim. Cat. Ceyl. Pl.* 106. Berghausia mutica, *Munro in Proc. Amer. Acad.* iv. (1864) 362.

Ceylon; in elevated parts of the Island, *Gardner*, &c.

Stem 3–4 ft., as thick as a goose-quill below, strict. *Leaves* 2 ft., linear, acute, base plicate, more or less hairy; sheath hirsute above or glabrous; ligule very s[illegible],

truncate, ciliate. *Panicle* 8–18 in.; rachis stout, strict; branches slender, rigid. *Spikelets* rather few and distant, geminate, lower subsessile, upper on capillary pedicels.

B. Leaves scattered, linear or very narrowly lanceolate, flaccid, articulate on the sheath.

6. **G. polypogonoides,** *Munro ex Oliver in Hook. Ic. Pl.* t. 1481; stem 6–12 in. slender, leaves $\frac{1}{10}$–$\frac{1}{4}$ in. broad lanceolate from a narrow base, panicle contracted flexuous, spikelets $\frac{1}{8}$ in. base bearded, gl. I and II entire one or both long-awned, III 3-awned. G. polygonoides, *Duthie Grass. N.W. Ind.* 12. Berghausia Emodi, *Endl. ex Miq. Analect. Bot.* II. 20. Miquelia Emodi, *Arn. & Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* I. (1843) 179; *Steud. Syn. Gram.* 119.—*Gen. Nov. Wall. Cat.* n. 8884.

TEMPERATE HIMALAYA; from Garwhal to Sikkim, alt. 6–9000 ft.

Stem tufted, rarely branched, about as thick as a crow-quill. *Leaves* 4–6 by $\frac{1}{12}$–$\frac{1}{4}$ in., hirsute towards the base; sheath with glabrous or pubescent margins; ligule very short, fimbriate. *Panicle* 2–5 in.; branches subscaberulous. *Spikelets* green or brown; gl. I narrowly lanceolate, 3-nerved; II broader; III dark brown, 2 lateral nerves excurrent as minute bristles, median awn many times longer than its gl., base twisted.

7. **G. stricta,** *Brongn. in Duperr. Voy. Bot.* 132, t. 21; stems 2–3 ft. tufted, leaves $\frac{1}{10}$–$\frac{1}{2}$ in. broad, lower lanceolate from a narrow base, panicle 2–10 in. very narrow, branches in distant fascicles, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in. base sparsely hairy, gl. I and II finely acuminate or II notched below the awn, III entire or notched awned or not, awn shorter or longer than its gl. G. ascendens & Griffithii, *Munro in Cat. Pl. Griff. Helf. &c. ined.* G. augustata, *Hack. mss.* G. sandvicensis, *Hillebr. Fl. Hawaii*, 513. ? Berghausia pallens & B. tenella, *Arn. ex Miquel Analect.* II. *Bot.* 21, 22. B. ascendens, *Munro mss.* Andropogon adscendens, *Heyne ex Wall. Cat.* n. 8906. — Chrysopogon ?, *Wall. Cat.* n. 8789. — Tripogon ?, *Wall. l. c.* n. 8891. — Gramin. *Wall. l. c.* n. 8906. — Aira, *Griff. Notul.* iii. 56, *Ic. Pl. Asiat.* t. 145.—*Herb. Wight*, n. 3243, 3244.

SUBTROPICAL and TEMPERATE HIMALAYA, from Garwhal to Mishmi and BURMA, alt. 4–9000 ft. KHASIA HILLS, alt. 4–6000 ft. BEHAR; on Parusnath, *Clarke.* CHOTA NAGPORE and WESTERN GHATS, from the Concan southward, *Wight*, &c. (*Kew distrib.* 6780, 6781, 6787).—DISTRIB. Sandwich Islds.

Annual ? *Stem* usually geniculate and branched at the base, rarely thicker than a crow-quill, stiff, nodes glabrous or pubescent. *Leaves* 6–10 in., lanceolate or linear-lanceolate, flat or margins involute, glabrous or hirsute or scabrid above; sheath glabrous or hirsute above; ligule short, truncate. *Panicle* strict or flaccid, branches scaberulous. *Spikelets* pale; gl. I and II 3-nerved, median nerve sometimes excurrent, III 1-nerved or nerveless, median awn $\frac{1}{2}$ in. or less.—Probably *G. patula*, Munro, of China and Tonkin, which has densely tufted leaves, is this species.

Var. *khasiana*, Stapf; stout, 3 ft. high, leaves sometimes nearly 1 in. broad, panicle a foot long.

Var. *breviaristata*, Stapf; gl. I and II not awned.

8. **G. arundinacea,** *Hook. f.*; stem branched, leaves lanceolate from a rounded or subcordate base flat acuminate, panicle 4–6 in. nodding, branches fastigiate capillary, spikelets $\frac{1}{12}$–$\frac{1}{8}$ in., gl. I and II notched and awned, awn of III twice as long as its gl. Andropogon arundinaceus *Heyne in Herb. Kottler.*

NILGHIRI HILLS, alt. 2–6000 ft., *Heyne*, &c.

Stem reedy, as thick as a pigeon's quill, branches ascending. *Leaves* 2–3 in. by

$\frac{3}{4}$ in. broad at the base; sheath villous at the top; ligule very short, pubescent. *Panicle* flexuous, branches and capillary pedicels scaberulous. *Spikelets* pale, base sparsely hairy; awns variable in length, median very slender, not twisted.

9. **G. Fergussonii,** *Trim. in Journ. Bot.* xxvii. (1889) 170; stem 1–3 ft., leaves linear densely bearded at the base, panicle 4–6 in. oblong, branches at length spreading, spikelets often in dimorphic pairs, upper $\frac{1}{8}$–$\frac{1}{5}$ in. base obscurely bearded, gl. I and II entire awned or not, III entire or tip 2-fid, awn twisted at the base at length deflexed. G. patula, *Thw. mss.* (C.P. 3947); *Trim. Cat. Ceyl. Pl.* 106. Andropogon Beckettii, *Thw. mss.*

Ceylon; Matale district, *Beckett*; Knuckle's Mts., alt. 5–6000 ft., *Fergusson.*

Stems smooth, branched. *Leaves* 4–8 by $\frac{1}{5}$–$\frac{1}{4}$ in., and sheath glabrous or sparsely hairy; ligule short, truncate. *Panicle* pale green or purplish, branches smooth. *Spikelets* in pairs, the upper often reduced to a glume; gl. I and II oblong-lanceolate, awn short or 0; III with a single awn about $\frac{1}{5}$ in. long.

10. **G. courtallensis,** *Thwaites Enum. Pl. Zeyl.* 363; stem 8–18 in. slender, leaves linear not densely bearded at the very narrow base, panicle 1–3 in. lax, branches at length spreading, spikelets sometimes in dimorphic pairs $\frac{1}{8}$ in. base obscurely hairy, gl. I and II lanceolate awnless or mucronate, III entire or tip notched, awn geniculate twisted below the knee. *Trim. Cat. Ceyl. Pl.* 106. Miquelia courtallensis, *Arn. ex Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 179; *Steud. Syn. Gram.* 119. Berghausia courtallensis, *Nees ex Miq. Analect. Bot.* II. 20.—*Wight Herb.* n. 2376.

Nilghiri and Travancore Hills, *Wight*, &c., alt. 6000 ft., *Lawson.* Ceylon; Adam's Peak, alt. 4000 ft., *Gardner*, &c.

Stems simple or branched. *Leaves* rarely 3 in. long, lanceolate, acuminate, spreading, membranous, more or less hairy, as are the sheaths; ligule very short. *Panicle* pale; branches smooth or slightly scaberulous. *Spikelets* few, shortly pedicelled; gl. I and II broader than usual in the genus, I thin, 3-nerved.—Batratherum, *Wall. Cat.* n. 8827, *Andropogon minutissimus*, Herb. Heyne, referred here by Steudel, is a totally different plant (see p. 147).

11. **G. micrantha,** *Thwaites Enum. Pl. Zeyl.* 363; stem 1–3 ft. branched and often creeping below, leaves linear-lanceolate from a narrow base, panicle 2–10 in. contracted lax-fld., branches capillary, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. subsolitary, gl. I and II acuminate, III shortly awned or mucronate. *Trim. Cat. Ceyl. Pl.* 106.

Ceylon; Central Province, alt. 2-4000 ft., *Thwaites* (C.P. 945).

Stems elongate, branched, tufted and ascending, or creeping below. *Leaves* 4–6 by $\frac{1}{3}$–$\frac{3}{4}$ in., sparsely hairy beneath; sheath glabrous except at the tip; ligule very short, truncate. *Panicle* pale green, at first contracted; branches scaberulous, at length spreading. *Spikelets* obscurely hairy at the base; awn about $\frac{1}{5}$ in., strict, not twisted.

Var. *nana*, Stapf; stem short very slender, panicle 1$\frac{1}{2}$–2 in., gl. III not awned Berghausia mutica, *var.* nana, *Munro mss.* Ceylon (C.P. 944).

12. **G. fuscata,** *Thwaites Enum. Pl. Zeyl.* 363; stems short tufted and creeping, base leafy, leaves short linear, panicle narrow few-fld., spikelets $\frac{1}{5}$ in. base shortly bearded, gl. I and II with setaceous tips, III with a long awn compressed and once twisted at the base. *Trim. Cat. Ceyl. Pl.* 106.

Ceylon; Saffragam dist., alt. 4000 ft., *Thwaites.*

Stem 1–4 in., compressed and leafy at the base; branches ending in a slender peduncle a foot long or less with one or two subulate leaves. *Leaves* chiefly radical, 1 by $\frac{1}{5}$ in., rather thick in texture, lanceolate, acute, flat, smooth, margins smooth thickened, cauline convolute; sheath very short, compressed, mouth bearded; ligule truncate. *Gl.* I and II strongly 3-nerved.—The specimens are insufficient for a satisfactory description. The species is quite unlike any other.

69. **POLYPOGON,** *Desf.*

Annual or perennial grasses. *Leaves* flat. *Spikelets* 1-fld., minute, jointed (but persistent) on their pedicels, laterally compressed, keeled, densely crowded on the short branches of a spiciform or lobed panicle; rachilla not produced beyond gl. III. *Glumes* 3; I and II equal, concave, keeled, 2-fid notched or entire, with a slender awn below the tip or in the sinus; III much-smaller, hyaline, sessile, truncate, toothed, awned or not; palea small, 2-nerved. *Lodicules* 2, falcate. *Stamens* 1–3, anthers small. *Ovary* glabrous; styles free. *Grain* obovoid, free within the gl. and palea. —Species few, natives of all warm regions.

1. **P. monspeliensis,** *Desf. Fl. Atlant.* i. 66; annual, panicle spiciform oblong or cylindric, gl. I and II oblong scaberulous ciliolate tip obtuse or notched, awn from the sinus or beneath it as long to many times as long as the gl., III 2-toothed shortly awned. *Beauv. Agrost.* 17, t. vi. f. 8; *Mutel Fl. Fr.* t. 76, 77; *Kunth Enum. Pl.* i. 232, *Suppl.* 181, t. xiii. f. 7; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 32; *Reichb. Ic. Fl. Germ.* t. 31; *Ledeb. Fl. Ross.* iv. 443; *Steud. Syn. Gram.* 184; *Boiss. Fl. Orient.* v. 520; *Benth. Fl. Austral.* v. 546; *Doell in Mart. Fl. Bras.* II. iii. 44, t. 126; *Thw. Enum. Pl. Zeyl.* 370, 444; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab. Pl.* 165; *Duthie Grass. N.W. Ind.* 30, *Fodd. Grass. N. Ind.* 50. P. cruentus, *Duthie l. c.* (error for *crinitus*). P. maritimus, *Duthie l. c.* (*not Willd.*). P. nepalensis, *Nees ex Steud. Nom. Ed.* II. ii. 378, *Syn. Gram. l. c.*; *Trin. in Mem. Acad. Petersb. Ser.* VI. iv. ii. (1845) 255; *Duthie l. c.* 30. P. fugax, *Nees ex Steud. l. c.*; *Duthie Fodd. Grass. N. Ind.* 51. P. paniceus, *Lag. Gen. & Sp. Nov.* 3. P. polysetus, *Steud. in Flora,* xii. (1829) 467. P. zeylanicus, *Nees ex Steud. Syn. Gram.* 182. Agrostis alopecuroides, *Lamk. Illustr.* 812. A. crinita, *Mœnch Meth.* 178. A. panicea, *Willd. Sp. Pl.* i. 128; *Engl. Bot.* t. 1704; *Moon, Cat. Pl. Ceyl.* 8. A.? Rora, *Herb. Ham. ex Wall. Cat.* n. 3777 B. A. triaristata, *Knapp Gram. Britt.* t. 23. Cynosurus paniceus, *Linn. Sp. Pl.* 73. Phleum crinitum, *Schreb. Gram.* i. 151, t. 20, f. 3; *Sm. Fl. Græc.* i. 46, t. 22; *Roxb. Fl. Ind.* i. 313. P. monspeliense, *Koel. Descr. Gram.* 57. Alopecurus aristatus, *Gouan Hort. Monsp.* 37; *Huds. Fl. Angl.* 28. Al. monspeliensis, *Linn. Sp. Pl.* 61. Al. paniceus, *Linn. l. c. Ed.* ii. 90. Phalaris cristata, *Forsk. Fl. Æg. Arab.* 17.—Agrostis, *Wall. Cat.* n. 3777.

Throughout CONTINENTAL INDIA (not seen from Burma and the E. Peninsula). WESTERN TIBET, ascending to 9000 ft., and CEYLON.—DISTRIB. Trop. and Temp. regions.

Stems tufted, 6 in.–2 ft., stout or slender, leafy, base geniculate, filiform and erect in starved states from Tibet, with very small spikes and very short awns. *Leaves* 3–6 by $\frac{1}{8}$–$\frac{1}{4}$ in., green, ligule oblong. *Panicle* $\frac{1}{2}$–6 in. long, $\frac{1}{4}$–1 in. broad, pale yellowish-green, silky, sometimes lobulate. *Spikelets* $\frac{1}{20}$–$\frac{1}{12}$ in., very shortly pedicelled. *Gl.* I and II very variable in breadth, obovate-oblong, sides scaberulous, keels scabrid, margins ciliate, tip entire notched or very shortly 2-fid; awns from the length of the gl. to $\frac{1}{3}$ in. long, excessively delicate; III very small, oblong,

glabrous, 2-fid, awned or not; palea oblong, tip notched. *Anthers* very minute, short. *Ovary* ovoid.—The starved Tibetan specimens are the *P. fugax*, Nees, they pass insensibly into the larger form. I have not found *P. maritimus* from any part of India. It may be distinguished by the deeply cleft gl. I and II.

2. **P. littoralis,** *Sm. Compend. Fl. Brit.* 13, *Engl. Bot.* t. 1251; annual or perennial, panicle lobed, gl. I and II subentire or notched, awn twice as long as the gl. or less, III awned or not. *Kunth Enum. Pl.* i. 233; *Reichb. Ic. Fl. Germ.* t. 31, vii. t. 75; *Steud. Syn. Gram.* 184; *Benth. Fl. Hongk.* 427; *Boiss. Fl. Orient.* v. 521; *Duthie Grass. N. W. Ind.* 30. P. elongatum, *Lagasc. Gen. & Sp. Nov.* 3 (*non Kunth*). P. Lagascæ, *Roem. & Sch. Syst.* ii. 226; *Trin. Diss.* 1, 170. P. demissus, *Steud l. c.* Agrostis littoralis, *Knapp. Gram. Britt.* t. 22. A. lutosa, *Poir. Encycl. Suppl.* i. 249; *Roem. & Sch. l. c.* i. 358. Santia elongata, *Parlat. in Webb. Phyt. Canar. Sect.* iii. 393.

Temperate Himalaya, alt. 4–10,000 ft., from Kashmir to Bhotan and Munnepore. Western Tibet; Iskardo, *Thomson.*—Distrib. Temp. and subtrop. regions.

Except by the uniformly shorter awns of the spikelets and usually broader lobed panicle, I find it very difficult to distinguish the annual form of this species from the common one of *P. monspeliensis*. In India *P. littoralis* does not descend to the plains, nor does it in the hills assume the filiform starved state of *P. monspeliensis*. In Europe it is always described as perennial, and as usually a littoral plant with a creeping root. The following forms occur in India.

P. littoralis proper; perennial, stem decumbent creeping and rooting below.

Var. *Higegaweri*; annual, stems tufted ascending. P. Higegaweri, *Steud. Syn. Gram.* 422; *Griseb in Goett. Nachr.* (1868) 82.

Var. *muticus*; perennial, stems creeping and rooting, gls. I and II apiculate, III awnless.—Kunawur, *Thomson.*

70. SPHÆROCARYUM, *Nees.*

A dwarf annual. *Stem* creeping and ascending, leafy throughout. *Leaves* ovate-cordate, acute, amplexicaul. *Spikelets* 1-fld., very minute, ovoid, pedicelled on the close-set capillary branches of a pyramidal panicle which is sessile in the axil of the uppermost leaf, jointed on the pedicels; rachilla jointed at the base, not produced beyond gl. III. *Glumes* 3, cymbiform; I and II glabrous, hyaline; I nerveless; II longest, 1-nerved; III hirsute, 1-nerved; palea as long as the gl., oblong, obtuse, keels distant. *Lodicules* 2, very minute. *Stamens* 3, anthers linear. *Ovary* narrowly ellipsoid; styles short, free. *Grain* ovoid, free, pericarp adherent to the seed.

S. elegans, *Nees ex Steud. Nom. Ed.* II. ii. 620. Sphærocarpum elegans, *Nees ex Steud. l. c.* 256. Grayia elegans, *Nees in Wight Cat.* n. 2033; *Steud. Syn. Gram.* 119. G. zeylanica, *Arn. ex Steud. Nom. Ed.* II. i. 705. Isachne pulchella, *Roth. Nov. Sp.* 58; *Kunth Enum. Pl.* i. 136; *Thw. Enum. Pl. Zeyl.* 362; *Trim. Cat. Ceyl. Pl.* 104; *Benth. Fl. Hongk.* 414. Panicum elegans, *Wight & Arn. ex Steud. Nom. Ed.* II. ii. 256. P. malaccense, *Trin. Gram. Panic.* 204; *Nees Agrost. Bras.* 212; *Kunth l. c.* 113; *Miq. Fl. Ind. Bat.* iii. 457. P. pulchellum, *Spreng. Syst.* i. 322. Agrostis malaccensis, *Koen. ex Heyne in Herb. Rottl.* Andropogon Grayia, *Steud. Nom. l. c.* i. 91.—Panicum, *Wall. Cat.* n. 8736.

SILHET and the KHASIA HILLS, in marshes, *Wallich*, &c. MERGUI, *Griffith*. SINGAPORE, *Ridley*. CEYLON, *Macrae*, &c.—DISTRIB. China.

Stem 6–12 in., as thick as a sparrow's quill, prostrate and rooting below, then erect, rarely branched, nodes bearded. *Leaves* all alike in size and form, $\frac{1}{8}$–$\frac{1}{4}$ in. long, acute or acuminate, ciliate-serrulate, subcoriaceous, ecostate, nerves very close-set; sheaths much shorter than the internodes, glabrous or hirsute; ligule of close-set white hairs. *Panicle* 1–1½ in., solitary and terminal, with very rarely 1–2 lower on the stem; peduncle very short; concealed in the leaf-sheath; rachis rather stout; branches very many, opposite and alternate, capillary, spreading. *Spikelets* $\frac{1}{40}$–$\frac{1}{30}$ in.—This is undoubtedly Roth's *Isachne pulchella*. The habit is that of *Panicum ovalifolium*, Poir, with the leaf-nervation of an *Isachne*. It differs from *Agrostis* in habit, and in the spikelets jointed on the pedicels (as in *Paniceæ*); and from *Sporobolus* in habit, foliage, and the adnate pericarp of the grain.

71. SPOROBOLUS, *Br.*

Perennial, rarely annual grasses. *Leaves* flat or convolute. *Spikelets* small or minute, 1–rarely 2-fld., in effuse or close or spiciform panicles, jointed on their pedicels, awnless; rachilla very short, jointed at the base, not produced beyond the flg. gl. *Glumes* 3, nerveless or 1–3-nerved, membranous; I and II unequal, persistent or singly caducous; III longer or shorter than I or II, 1-nerved; palea often splitting between the 2 very close nerves. *Lodicules* very minute or 0. *Stamens* 2–3, anthers short. *Styles* short, free. *Grain* loose within the gl. and palea, pericarp or its epidermis loose, deciduous, rarely adherent.—Species about 80, chiefly tropical.

* Glumes I and II both much shorter than III.

1. **S. diander,** *Beauv. Agrost.* 25; panicle narrowly pyramidal, branches capillary in scattered fascicles, spikelets $\frac{1}{20}$–$\frac{1}{18}$ in., gl. I and II hyaline truncate nerveless, grain oblong or obovoid-oblong. *Jacq. Eclog. Gram.* t. 28; *Link Enum. Hort. Reg. Berol.* i. 87; *Kunth Enum. Pl.* i. 213; *Wall. Cat.* n. 3765; *Griff. Notul.* iii. 46, *Ic. Pl. Asiat.* t. 139, f. 85; *Dalz. & Gibs. Bomb. Fl.* 296; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 108; *Aitchis. Cat. Panjab Pl.* 165; *Duthie Grass. N.W. Ind.* 29, *Fodd. Grass. N. Ind.* 40, t. 63; *Miquel Fl. Ind. Bat.* iii. 375; *Benth. Fl. Austral.* vii. 622. Vilfa diandra, *Wight Cat.* n. 1744 (*non Trin.*). V. erosa, *Trin. in Mem. Acad. Petersb. Ser.* vi. *Sc. Nat.* v. II. (1840) 86; *Steud. l. c.* 159. V. Retzii, *Steud. Nom. Ed.* II. ii. 768, *Syn. Gram.* 162. Agrostis contracta, *Herb. Heyne ex Wall. Cat.* n. 3766 A. A. diandra, *Retz. Obs.* v. 19; *Roxb. Fl. Ind.* i. 317. Panicum secundum, *Herb. Heyne ex Wall. l. c.* —Sporobolus, *Wall. Cat.* 3766, 3768.—Sporobolus, *Griff. l. c.* 44, *Ic.* t. 149, f. 2.

Throughout INDIA and BURMA, ascending the Himalaya to 5500 ft. CEYLON.—DISTRIB. Asia and Austral. trop.

Stems 1–3 ft., slender. *Leaves* densely tufted, 3–10 in., very narrow, flat or convolute, margins entire; ligule a few hairs. *Panicle* 4–10 in., rachis very slender, sometimes capillary, strict; branches $\frac{1}{4}$–1 in., sometimes flowerless at the base. *Spikelets* sessile or very shortly pedicelled; gl. I and II not half as long as III, broadly truncate and usually erose; III obtuse or subacute, obscurely 1-nerved. *Stamens* 2–3. *Grain* subtruncate, pericarp rather adherent.

2. **S. indicus,** *Br. Prodr.* 170; stem stout, panicle very narrow branches short appressed covered to the base with crowded spikelets $\frac{1}{18}$–$\frac{1}{12}$

in. long, gl. I and II obtuse hyaline 1-nerved, III opaque, grain broadly obovoid. *Link Hort. Reg. Berol.* i. 87; *Kunth Enum. Pl.* i. 211; *Thw. Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 108; *Duthie Fodd. Grass. N. Ind.* 49; *Benth. Fl. Hongk.* 426, *Fl. Austral.* vii. 622; *Griseb. Fl. Brit. W. Ind.* 533. S. angustus, *Buckl. in Proc. Acad. Sc. Philad.* (1862) 88. S. elongatus, *Br. Prodr.* 170; *Hook. Handb. N. Zeal. Fl.* 327; *Miq. Fl. Ind. Bat.* iii. 376; *Duthie Grass. N.W. Ind.* 29. S. Lamarckii, *Desv. in Ham. Prodr. Fl. Ind. Occ.* 4. S. minor, *Kunth Enum. Pl.* i. 212. S. tenacissimus, *Beauv. Agrost.* 26; *Kunth l. c.* 212, *Suppl.* 167; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 28; *Duthie Fodd. Grass. N. Ind.* 49. Vilfa capensis & elongata, *Beauv. Agrost.* 16; *Trin. Gram. Diss.* i. 154; *Steud Syn. Gram.* 159. V. exilis, *Trin. in Mem. Acad. Petersb. Ser.* vi. *Sc. Nat.* v. II. (1840) 89; *Steud. l. c.* 159. V. indica, *Trin. ex Steud. Nom. Ed.* II. ii. 767, *Syn. Gram.* 162; *Baker Fl. Maurit.* 449. V. tenacissima, *H. B. & K. Nov. Gen. & Sp.* i. 138; *Nees Agrost. Bras.* 393; *Trin. Sp. Gram. Ic.* t. 60; *Steud. l. c.* 160. P. rupestris, *Trin. Diss.* ii. 22; *Steud. l. c.* 161. Agrostis elongata, *Lamk. Illustr.* i. 142. A. fertilis, *Steud. l. c.* 170. A. indica, *Linn. Sp. Pl.* 63. A. tenacissima, *Jacq. Collect.* i. 85, *Ic. Rar.* 3, t. 16 (*excl. Syn.*). A. tenuissima, *Spreng. Syst.* i. 258.—Sporobolus, *Wall. Cat.* n. 3766, B, 3767.

Throughout INDIA, ascending the Himalaya to 5000 ft., BURMA and CEYLON.—DISTRIB. All warm countries.

Stem 2–3 ft., sometimes as thick as a small goose-quill at the base. *Leaves* 8–24 in., convolute or flat, rarely $\frac{1}{3}$ in. diam., margins smooth; ligule a few hairs. *Panicle* 6–18 in., often interrupted; rachis stout, erect, or curved; branches erect, $\frac{1}{2}$ in. or longer, often whorled, densely clothed usually to or to near the base with green spikelets, which are erect and imbricate. *Spikelets* larger than in *S. diander*. Gl. I = about $\frac{1}{3}$ III; II not twice as long; III acute. *Pericarp* adherent.—It is not always easy to distinguish this from *S. diander*, which is much the most common in India. In its normal state *indicus* is a far more robust plant, with a stout rachis and branches of the panicle, larger and more herbaceous more crowded spikelets, and a broader grain; but both vary greatly in the panicle.

3. **S. minutiflorus,** *Link Enum. Hort. Berol.* i. 88; tall, slender, leaves long, panicle very large effuse supra-decompound, branches capillary, spikelets $\frac{1}{30}$ in., gl. I minute subquadrate, II = $\frac{1}{2}$ III orbicular-ovate obtuse, grain broadly obovoid. *Kunth Enum. Pl.* i. 214. Vilfa capillaris, *Wight & Arn. ex Wight Cat.* n. 2036 (*non Miq*). V. minutiflora, *Trin. Diss.* i. 158; *Steud. Syn. Gram.* 158. V. mangalorica, *Hochst. ex Miq. Analect. Bot.* ii. 24; *Steud. l. c.* 159. V. tenuissima, *Schult Mant.* ii. 479. Panicum tenuiflorum, *Hort. Monac. ex Link. l. c.* P. tenuissimum, *Mart. ex Schrank in Denkschr. Bot. Ges. Regensb.* ii. (1822) 26.

The DECCAN PENINSULA, *Wight.* CANARA, *Hohenacker.*

Stem 2–3 ft. *Leaves* narrow, flat, finely acuminate, margins quite smooth; ligule of minute hairs. *Panicle* 12–18 in., erect; rachis quite smooth, very slender; branches innumerable, 1–2 in., spreading, and branchlets excessively slender, flowering at the tips. *Spikelets* ellipsoid, dark colrd.; gl. I truncate; II broadly ovate, obtuse, nerveless; III ovate-oblong, obtuse, nerveless; palea shorter, broad, truncate. *Stamens* 2.

4. **S. Wallichii,** *Munro mss.*; very tall, erect, leaves long, panicle tall oblong or subpyramidal decompound branches capillary, branchlets divaricate few-fld., spikelets $\frac{1}{10}$ in., gl. I minute truncate, II = $\frac{1}{2}$ III or

longer ovate acuminate, grain broadly obliquely obcordate. Sporobolus, *Wall. Cat.* n. 3769 A.

Behar; Rajmahal Hills, *Wallich.* Pegu, *Kurz.* Ceylon; between Trincomalee and Kantalla, *Ferguson.*

Perennial? *Stem* 3–4 ft., as thick as a crow-quill, strict, sparingly leafy. *Leaves* 1–2 ft. by $\frac{1}{8}$–$\frac{1}{4}$ in., quite smooth; upper sheaths very long; ligule 0. *Panicle* 12–18 in. by 4–5 broad, branches opposite and whorled, branchlets flowering towards the tips. *Spikelets* pale brown; gls. II and III faintly 1-nerved; palea oblong, truncate, as long as its gl. *Stamens* 3.—Habit of *S. minutiflorus*, but spikelets very different.

5. **S. ioclados,** *Nees Fl. Afr. Austral.* 161; leaves short, panicle oblong or subpyramidal effuse, branches capillary, spikelets $\frac{1}{16}$–$\frac{1}{12}$ in. scattered, gl. I lanceolate $= \frac{1}{3}$ III, II $= \frac{2}{3}$ III oblong-lanceolate obtuse, grain linear-oblong truncate. Vilfa ioclados, *Nees ex Trin. in Mem. Acad. Petersb. Ser.* VI. *Sc. Nat.* v. II. (1840) 65.

Scind, *Stocks.*—Distrib. S. Africa.

Stems 10–18 in., densely tufted, rather stout. *Leaves* 2–3 in., narrow, densely tufted, sheath short; ligule obscure. *Panicle* 3–7 in., branches opposite and alternate, spreading. *Spikelets* oblong, pale.—A very elegant grass.

** Glume I as long as III or nearly so. Panicle contracted.

6. **S. virginicus,** *Kunth Revis. Gram.* i. 67, *Enum. Pl.* i. 210, *Suppl.* 167; stems erect from a decumbent woody creeping base, leaves strict distichous convolute pungent, panicle elongate narrow interrupted branches very short, spikelets $\frac{1}{10}$–$\frac{1}{12}$ in. subsessile crowded, gls. I and II oblong-lanceolate acute, I shorter than II, grain broadly obovoid. *Trim. Cat. Ceyl. Pl.* 108; *Benth Fl. Austral.* vii. 621; *Griseb. Fl. Brit. W. Ind.* 533. S. littoralis, *Kunth l. l. c. c.* 68, 213. Vilfa barbata, *Beauv. Agrost.* 16. V. littoralis, *Beauv. l. c.*; *Steud. Syn. Gram.* 162. V. murina, *Sieb. ex Steud. l. c.* 157. V. orientalis, *Wight Cat.* n. 1745 (*in part*). V. virginica, *Beauv. l. c.*; *Trin. Diss.* i. 155; *Sp. Gram. Ic.* t. 48; *Steud. l. c.* 157; *Baker Fl. Maurit.* 449. Agrostis barbata, *Pers. Syn.* i. 75. A. littoralis, *Lamk. Illustr.* 161. A. pungens, *Pursh Fl. Am. Sept.* 64. A. virginica, *Linn. Sp. Pl.* 63; *Labill. Pl. Nov. Holl.* i. 20, t. 23. Podosemum virginicum, *Link Enum. Hort. Berol.* i. 85. Calotheca sabulosa, *Steud. in Flora*, xii. (1829), II. 488. Crypsis maritima, *Munro ex Macowan in Cape Monthly Mag. N.S.* iii. (1871), *Suppl.* 7.

Ceylon; common on the shores, *Heyne? Trimen.*—Distrib. Westwd. to tropical Africa and America; eastwd. to Australia.

Perennial. *Stem* as thick as a duck's quill, branched, hard and often tortuous at the base, then erect or ascending 6–10 in. high. *Leaves* close-set, erecto-patent, 1–3 in. long or more, narrow and almost terete from the involute margins, very pale, glabrous or scaberulous above, striate; sheaths terete, short or long; ligule of long soft hairs. *Panicle* 1–4 in., subspiciform, very pale, narrow but more or less interrupted. *Spikelets* very shortly pedicelled; gls. all 1-nerved, keels glabrous or obscurely scabrid towards the tip; palea oblong, narrowly truncate. *Grain* with the pericarp loosened if moistened.—Trinius' figure represents gl. I as shorter than in the Ceylon specimens and others that I have examined. It is remarkable that this grass should have no certain habitat on the shores of continental India. There is a specimen from Heyne in Rottler's herbarium, marked "Nawülus, 21st Aug., 1794," a word which sounds more Cingalese than Indian. There is another in *Wight's herbarium*, where *S. orientalis*, *spicatus*, *tremulus* and *virginicus* are all fastened on the same sheet as No. 1745. *S. pungens*, Kunth, of the Mediterranean

region, from Spain to Egypt and Arabia, is a slight variety with a stouter dense panicle, which Dr. Stapf and I have independently sought in vain to distinguish by any other character, and this is of the slightest.

7. **S. glaucifolius,** *Hochst. in Flora,* xxv. (1842) I. *Bieb.* 123; slender, glaucous, leaves short strict narrow flat or undulate glaucous not pungent, panicle elongate contracted white, branches very short erect, spikelets $\frac{1}{16}$ in. subsessile crowded, gls. I and II subequal ovate-lanceolate acuminate as long as III or rather longer. Vilfa glaucifolia, *Steud. Syn. Gram.* 154. V. scabrifolia, *Hochst. ex Edgew. in Journ. Linn. Soc.* vi. (1862) 196; *Aitchis. Cat. Panjab Pl.* 165. Agrostis barbata, β, senegalensis, *Pers. Syn.* i. 76. A. littoralis β, *Lamk. Illustr.* 161; *Poir. Encycl. Suppl.* i. 251.

The Panjab. Dehra Ismael Khan, *Duthie*; Multan, *Edgeworth.* Scind, *Stocks.* —Distrib. Afr. trop.

Perennial; stems 12–18 in., densely tufted. *Leaves* 2–5 by $\frac{1}{10}$–$\frac{1}{8}$ in., narrowed from the cordate base to the finely acuminate tip, margins smooth, somewhat hairy towards the base; ligule a ridge of minute hairs. *Panicle* 3–5 in., interrupted, very pale yellowish. *Spikelets* very shortly pedicelled; gls. all 1-nerved; I and II hyaline, puncticulate; I rather shorter and narrower than II.—Of the synonymy cited above that of *V. littoralis* β, and the two sp. of *Agrostis* are taken from J. Gay's mss. on a Senegal specimen in Herb. Kew. Of *V. scabrifolia* I know nothing, nor where Edgeworth gets the name (which is not in the "Kew Index," but from his citing Stock's number (667) as the same plant, there is no doubt that *S. glaucifolius* is that meant. Edgeworth (l. c. 182) mentions this amongst other plants of which the seeds are swept up for food by the poorer classes of the desert.

*** Glume I shorter than II and III.

† *Panicle contracted. Perennials, except S. piliferus.*

8. **S. tremulus,** *Kunth Revis. Gram.* i. 67, *Enum. Pl.* i. 210, *Suppl.* 166; stoloniferous, leaves short subulate or filiform flat or convolute pungent margins smooth, spikelets $\frac{1}{16}$ in., gl. I shorter than III lanceolate, II as long as III or longer, grain oblong. S. geniculatus, *Nees ex Aitchis. Cat. Panjab Pl.* 165. S. orientalis, *Trim. Cat. Ceyl. Pl.* 108 (*non Kth.*). Vilfa geniculata, *Nees ex Steud. Syn. Gram.* 156; *Herb. Wight* n. 3307. V. orientalis, *Wight Cat.* n. 1745 (*in part*). V. tremula, *Trin. Diss.* i. 155; *Steud. l. c.* 160. Agrostis juncea, *Lamk. Encycl.* i. 60, *Illustr.* t. 41, f. 2. A. Phuldubbha, *Herb. Ham. ex Wall. Cat.* n. 3770. A. tenacissima, *Roxb. Fl. Ind.* i. 316 (*excl. Syn.*). A. tremula, *Willd. Sp. Pl.* i. 372 (*excl. Syn.*). Zoysia? tremula, *Beauv. Agrost.* 148.—Sporobolus, *Wall. Cat.* n. 3770, 3771.

Plains of India, from the Panjab to Bengal and southwd. Pegu, *Kurz.* Ceylon, *Trimen.*—Distrib. Tonkin, Cambodia.

Stems 2–6 in., many from a hard knotted stoloniferous stock, erect or prostrate, wiry; stolons 6–18 in., stout or slender, leafy, flexuous. *Leaves* $\frac{1}{2}$–2 in., rigid, narrowed from the usually hairy base to the tip; ligule a few hairs. *Panicle* 1–4 in., subspiciform, sometimes longer flexuous and interrupted, branches short rarely a few spreading; pedicels short. *Spikelets* crowded, subpersistent on the very short pedicels, very pale; glumes all 1-nerved; palea as long as its gl. *Stamens* 3.—A very common and variable pasture grass. *Vilfa geniculata* is a large state from Madras, with almost woody stems 12–18 in. long and flat leaves.

9. **S. spicatus,** *Kunth Revis. Gram.* i. 67, *Enum. Pl.* i. 210; stoloniferous, leaves short rigid, panicle slender cylindric, spikelets $\frac{1}{16}$ in.,

gl. I minute, II lanceolate acute, grain obliquely oblong. *Boiss. Fl. Orient.* v. 512. S. orientalis, *Herb. Wight* n. 3303, 3304, *Cat.* n. 1745 (*in part*). Vilfa spicata, *Beauv. Agrost.* 16; *Trin. Diss.* 1, 152, *Sp. Gram. Ic.* t. 12; *Steud. Syn. Gram.* 160. ?Agrostis involuta, *Poir. Encycl. Suppl.* i. 252. A. spicata, *Vahl Symb.* i. 9; *Del. Fl. Ægypt.* 20, t. 10, f. 1. A. virginica, *Forsk. Fl. Æg. Arab.* 20 (*ex Kunth*).—Sporobolus, *Wall. Cat.* n. 3773.

The DECCAN PENINSULA, *Heyne*; Palamcottah, *Wight.*—DISTRIB. Arabia, Egypt, trop. Africa.

Stem 6–12 in., from a hard stoloniferous rootstock, stiff, strict above the geniculate base. *Leaves* 1–2 in., divaricate, pungent, scabrid above; ligule 0. *Panicle* spiciform, 2–3 in. by $\frac{1}{10}$–$\frac{1}{8}$ in. diam. *Spikelets* sessile, persistent on the branchlets, pale. *Glumes* hyaline, I rounded; II 1-nerved; III ovate-lanceolate; palea as long as the gl. *Grain* obliquely oblong or orbicular-oblong.—*Agrostis involuta*, Poir., referred here by Sprengel, is a Marocco plant, which may be *S. virginicus* or *pungens*.

10. **S. orientalis,** *Kunth Enum. Pl.* i. 211; stoloniferous, leaves pungent, margins serrulate, panicle narrowly oblong, spikelets $\frac{1}{14}$–$\frac{1}{12}$ in., subsessile, gl. I = ¼ III or shorter tip rounded, II = III or longer obtuse, grain obovoid. *Dalz. & Gibs. Bomb. Fl.* 295. S. humifusus, *Trim. Cat. Ceyl. Pl.* 108 (*non Kunth*). Vilfa diandra, *Trin. Diss.* i. 154 (*excl. Syn. Retz.*). V. orientalis, *Nees ex Trin. in Mem. Acad. Petersb. Ser.* vi. *Sc. Nat.* v. II. (1840), 65; *Wight Cat.* n. 1745 (*in part*); *Steud. Syn. Gram.* 156. Agrostis elongata, *Roth. Nov. Sp.* 41. A. orientalis, *Nees Agrost. Bras.* 393 (*excl. Syn. Roxb.*). A. pungens, *Herb. Heyne ex Wall. Cat.* n. 3772. A. tenacissima, *Linn. f. Suppl.* 107 (*excl. Syn. Jacq.*).—Sporobolus, *Wall. l. c.*

The DECCAN PENINSULA, *Heyne, Wight.* CEYLON, at Calpentyn, *Trimen.*

Stem 6–18 in., base stout, hard, branching, branches and flowering stems usually geniculate below. *Leaves* very variable, 1–6 in., suberect or spreading, more or less pungent, glabrous or hairy above; ligule 0. *Panicle* 1½–4 in., erect, subspiciform or more open with here and there short horizontally spreading branches that are naked below, usually pale. *Spikelets* closely packed; gl. I nerveless, II and III 1-nerved.—The Ceylon and Heyne's specimens are 12–18 in. high with long flat leaves and narrow open panicles, Wight's are shorter and stouter with spiciform panicles, and closely resemble states of *S. tremulus*, from which the short obtuse gl. I at once distinguishes it. Although in Herb. Wight Prop. the four species mentioned in the notes to *S. virginicus* are all included under No. 1745, *S. orientalis*, the latter alone bears that number in Herb. Hook. and Herb. Benth.

11. **S. piliferus,** *Kunth Enum. Pl.* i. 211 (var. α); annual, leaves hairy serrulate, panicle linear branches very short erect, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in., gl. I ½–⅔ III lanceolate, II longer than III oblong-lanceolate, III oblong, grain oblong compressed. S. ciliatus, *Munro in Herb. Ind. Or. Hf. & T.*; *Duthie Grass. N.W. Ind.* 29 (*non* Vilfa ciliata, *Presl.*). Vilfa pilifera, *Trin. Diss.* i. 157, ii. 23, *Sp. Gram. Ic.* t. 58. Triachyrum nilagiricum, *Steud. in Hohen. Pl. Ind. Or.* n. 931.—Sporobolus, *Wall. Cat.* n. 3774.

WESTERN HIMALAYA; from Kashmir to Nepal, alt. 3–8000 ft., *Wallich*, &c. The KHASIA HILLS, alt. 5000 ft. MYSORE, at Belgaum, *Ritchie.* NILGHIRI HILLS, *Wight*, &c. MALACCA, *Hervey.*

Stems 3–12 in., densely tufted, erect, roots fibrous. *Leaves* 1–4 in., chiefly radical, narrowed from the base to the tip, flat or convolute, sparsely hairy above and at the mouth of the sheath, margins serrulate below or nearly to the tip; ligule 0. *Panicle* 1–3 in., strict, erect, dense-fld., often interrupted. *Spikelets* brown; gl. I nerveless; II and III 1-nerved, callus minute; palea oblong. *Stamens* 2, anthers very short.—Trinius figures this plant from a Brazilian and a Nepalese specimen.

The latter from Wallich is a very dwarf form, which is not uncommon in the Himalaya. The Brasilian is Kunth's *β. major*, is a much larger specimen, and may or may not be specifically the same. *S. ciliatus*, Presl, to which *S. piliferus* was referred by Munro, is a Panama plant, and is, I think, from the description different.

†† *Panicle open, effuse.*

12. **S. arabicus,** *Boiss. Diagn. Pl. Or. Ser.* I. xiii. 47; perennial, stems many from a woody stoloniferous base, leaves rigid narrow, panicle pyramidal, spikelets $\frac{1}{15}$ in. crowded subsessile at the ends of the branches, gl. I minute ovate, II ovate-oblong acute as long as III. S. pallidus, *Boiss. Fl. Orient.* v. 514 (*non Lindl.*); *Aitch. Cat. Panjab Pl.* 165 (*excl. Syn.*) ?*Duthie Grass. N.W. Ind.* 29, *Fodd. Grass. N. Ind.* 50. Vilfa pallida, *Nees ex Trin. in Mem. Acad. Petersb. Ser.* VI. *Sc. Nat.* v. ii. (1840) 62; *Steud. Syn. Gram.* 155. V. arabica, *Steud. l. c.* 241.

Panjab Plains; *Royle*, &c. Wazuristan, ascending to 7000 ft., *Stewart.* Rohilkund, *Duthie.* Scind, *Stocks.*—Distrib. Arabia, Beluchistan.

Woody base of the stem sometimes as thick as the middle finger, sending out rigid often geniculate stolons, and stout or slender flowering branches 6–24 in. high. *Leaves* 1–10 in. by $\frac{1}{8}$–$\frac{1}{6}$ in., narrowed from the rounded base to the tip, flat or convolute, scaberulous above, finely ciliate-serrulate; ligule 0. *Panicle* 2–6 in. long, branches whorled, capillary, naked below. *Spikelets* subspicate on the branchlets, oblong, pale; gl. II and III obtuse, 1-nerved; palea as long as its gl. *Grain* subglobose.—The synonymy of this plant is perplexing, owing to the double use of the specific name *pallidus*, and to the fact of *Vilfa* being now regarded as a synonym of *Sporobolus*. This name (*pallidus*) was applied by Nees in 1840 to the Arabian plant described above, under *Vilfa*; and by Lindley in 1848 to a very different Australian one, under *Sporobolus*. Bentham (*Fl. Austral.* vii. 623) assuming that Nees had referred his plant to *Sporobolus*, renamed Lindley's *S. Lindleyi*. Lastly, Boissier, when he founded his *S. arabicus*, was not aware that it was Trinius's *Vilfa pallida*, which he erroneously cites in Fl. Orient., under *Sporobolus pallidus*, Trin. In this case the proper course appears to me to be to retain the name *Sp. pallidus*, Lindl., for the Australian plant, and *Sp. arabicus*, Boiss., for the Arabian and Indian.

13. **S. pulchellus,** *Br. Prodr.* 170; annual, slender, leaves narrowly lanceolate flat spinulosely serrulate, panicle oblong, branches whorled capillary few-fld towards the tips, spikelets $\frac{1}{20}$ in. shortly pedicelled, gl. 1 = ½ II obtuse, keels of both ciliate, II = III broadly ovate acuminate. *Kunth Revis. Gram.* ii. 106, t. 123, *Enum. Pl.* i. 215, *Suppl.* 171; *Benth. Fl. Austral.* vii. 623. S. capillaris, *Arn. ex Miq. Ann. Bot. Ind.* II. 25 (non *Vilfa capillaris*, Wt. & Arn.). Vilfa pulchella, *Trin. Diss.* i. 160. Agrostis pulchella, *Roth. Nov. Sp.* 41. Panicum montanum, *Ham. ex Wall. Cat.* n. 8883.—Sporobolus, *Wall. l. c.*

Behar, *Wallich, Thomson.* Chota Nagpore, *Clarke.*—Distrib. Australia.

Stem 6 in.–2 ft., filiform or capillary, strict, erect from the base or nearly so, distantly leafy. *Leaves* 2–5 in., gradually narrowed from the rounded base to the finely acuminate tip, margins with tubercle-based cilia below; ligule 0. *Panicle* 2–6 in., loose, whorls of many branches at regular intervals. *Spikelets* reddish-brown? glumes almost hyaline, obtuse. *Grain* globose; pericarp loose, hyaline.—Bentham observes that Kunth's figure is of an unusually narrow-leaved form with the remarkable cilia not represented.

14. **S. coromandelianus,** *Kunth Revis. Gram.* i. 681, *Enum. Pl.* i. 213; annual, leaves lanceolate flat spinulosely serrulate, panicle pyramidal branches whorled capillary, spikelets $\frac{1}{20}$ in., gl. 1 minute

oblong or lanceolate, II = III both ovate-lanceolate acuminate. *Dalz. & Gibs. Bomb. Fl.* 296; *Trim. Cat. Ceyl. Pl.* 208; *Wall. Cat.* n. 3764. S. commutatus, *Kunth Enum.* i. 214; *Miq. Fl. Ind. Bat.* iii. 376 (*excl. Syn. pulchellus*); *Boiss. Fl. Orient.* v. 513; *Aitch. Cat. Panjab Pl.* 165; *Duthie Grass. N.W. Ind.* 29. S. discosporus, *Nees Fl. Afr. Austr.* 158. Vilfa commutata, *Trin. Diss.* i. 156; *Wight Cat.* n. 1743. V. coromandeliana, *Beauv. Agrost.* 15; *Trin. Sp. Gram. Ic.* t. 11 (*gl. I omitted*); *Steud. Syn. Gram.* 153. V. discospora, *Trin. in Mem. Acad. Petersb. Ser.* VI. *Sc. Nat.* ii. (1841) 59. V. Roxburghii, *Nees ex Trin. l. c.* V. Roxburghiana, *Nees ex Wight Cat.* n. 1742; *Steud. Nom. Ed.* II. ii. 59. Triachyrum cordofanum, *Hochst. ex Steud. Syn. Gram.* 176. T. discosporum, *Steud. l. c.* Agrostis coromandeliana, *Retz. Obs.* iv. 19; *Vahl Symb.* i. 10; *Roxb. Fl. Ind.* i. 316. A. indica, *Forsk. Fl. Æg. Arab.* 104. A. Rura, *Hb. Ham. ex Wall. l. c.* B.

Plains of India, from the Punjab eastward to Burma, and southward to Ceylon. —Distrib. Affghan. N. and S. Africa. (Texas and Mexico, introd. ?).

Stems many, 4–12 in., spreading from the root, leafy. *Leaves* 1–3 by $\frac{1}{6}$–$\frac{1}{3}$ in., narrowed from the subcordate base to the finely acuminate tip, spinulosely toothed especially towards the base; mouth of sheath villous. *Panicle* very large for the size of the plant, 2–6 by 1–4 in., branches 4–6 in subsecund whorls, $\frac{1}{2}$–2 in. long, branchlets drooping 1–2-fld. *Spikelets* subglobose; glumes hyaline, all 1-nerved or I nerveless. *Stamens* 2, anthers very short. *Grain* obliquely oblong or subglobose.—Nees Fl. Afr. Austr. refers *Agrostis pulchella*, Roth., to *Sp. commutatus*, as var. β. *Trinianus*, Arn. et Nees Glum. Ind. Or. ined., with panicle ovate and gl. I 5–6 times shorter than *commutatus*.

Var. *Collettii*; panicle narrowly pyramidal or conical 2–3 in. long by 1–1¼ in. across the lower branches, spikelets bright red-brown.—Shan Hills, *Collett.*

DOUBTFUL SPECIES.

Vilfa rigidifolia, *Trin. in Mem. Acad. Petersb. Ser.* vi. *Sc. Nat.* v. II. (1840) 80.—E. Indies, *Herb. Thouars.*—Described by Trinius as having spikelets 2 (French) lines long, which is twice as long as any Indian species known to me.

72. **AGROSTIS,** *Linn.*

Perennial, rarely annual grasses. *Leaves* usually flat. *Spikelets* small, 1-fld., in effuse or contracted panicles with capillary whorled branches, not jointed on their pedicels; rachilla not produced beyond gl. III. *Glumes* 3, I and II equal or unequal (sub-awned in *A. subaristata*), keeled, 1-rarely 3-nerved; III membranous, 5-nerved, truncate, glabrous, awn dorsal or 0, callus glabrous or with few minute hairs; palea nearly as long as its gl. or shorter or 0, 2-nerved or nerveless. *Lodicules* 2. *Stamens* 3, anthers long or short. *Grain* free within the gl.—Species about 100, chiefly in N. temp. regions.

The genera *Agrostis*, *Calamagrostis*, and *Deyeuxia* are, as all authors agree, separated by artificial characters and are not well limited by these. It therefore becomes a question of expediency how to limit them, and the addition of many hitherto undescribed Himalayan species has not tended to aid this operation. Many authors make of *Deyeuxia* a section of *Calamagrostis*. Bentham keeps them distinct, but confines *Calamagrostis* to species with gl. I and II longer than III. After much study, I conclude that for taxonomic purposes, the most practical arrangement is to confine *Agrostis* to species with no elongation of the rachilla, and a naked or almost naked callus of gl. III (a character appreciated by most authors); to refer to *Calamagrostis* those with a villous callus but with no elongation of the rachilla,

and to *Deyeuxia*, those with both a villous callus and the rachilla elongate beyond gl. III and (with a few exceptions) penicillate. I know of no species of *Agrostis* with the last-mentioned character of *Deyeuxia*, but there are species of *Agrostis* with longer hairs than normal in the callus, and of *Calamagrostis* with shorter hairs than normal; there are also species of the latter genus with a minute elongation of the rachilla, and of *Deyeuxia* in which that organ is short. There is no Indian *Agrostis* except *A. myriantha* with the tall coarse habit of several species of *Calamagrostis* and *Deyeuxia*, but many species of these two genera have the slender habit of *Agrostis*, and can only be distinguished from it by the minute characters given above. The species of *Calamagrostis* with the gl. III hairy all over form a peculiar section, well limited by this character; their habit is altogether that of *Agrostis*.

* Palea half as long as gl. III or longer, rarely minute.

1. **A. alba,** *Linn. Sp. Pl.* 63; ligule oblong, flowering panicle spreading fruiting contracted, branches nearly smooth, spikelets $\frac{1}{12}$ in., gl. I and II subequal acute, III about $\frac{1}{4}$ shorter rarely awned, tip truncate crenate, callus quite glabrous. *Kunth Enum. Pl.* i. 219, *Suppl.* 175; *Boiss. Fl. Orient.* v. 514; *Schrad. Fl. Germ.* t. 2; *Fl. Dan.* x. t. 1623; *Engl. Bot.* t. 1189; T. *Nees Gen. Fl. Germ. Monoc.* i. n. 29; *Reichb. Ic. Fl. Germ.* t. 33–36; *Ledeb. Fl. Ross.* iv. 436; *Aitchis. Cat. Panjab Pl.* 165; *Duthie Grass. N.W. Ind.* 29. A. diffusa, *Host Gram. Austr.* iv. t. 55. A. Michauxii, *Herb. Strach. & Winterb.* A. mutabilis, *Knapp Gram. Britt.* t. 28. A. Wightii, *Schmid. Coll. Pl. Nilgh.*; *Herb. Wight Propr.* 1746 (*in part*). A. Royleana, *Trin. Agrost.* ii. 125.

WESTERN HIMALAYA and WESTERN TIBET, alt. 6–11,500 ft., from Kashmir to Kumaon. SIKKIM, alt. 7500 ft. (introd. ?). NILGHIRI HILLS (introd.).—DISTRIB. N. temp. regions.

Stems 1–3 ft., stoutly ascending from a tufted base, erect, slender. *Leaves* rather short, flat, nearly smooth; ligule variable in length. *Panicle* 2–8 in. long, pyramidal. *Spikelets* green or purplish, usually shining; palea = about $\frac{1}{2}$ of gl. III.—The above description applies to the common Himalayan form of *A. alba*, and accords with the European. I have not cited its multitudinous synonyms, of which 50 are recorded in the "Kew Index," for many apply to obscure forms or varieties none of which occur in India; except var. *stolonifera* (A. stolonifera, *Host Gram. Austr.* t. 57) of which there are Nilghiri specimens, but no doubt introduced. The awned variety γ. *aristata*, Boiss. l. c., a widely distributed European, American, and Asiatic plant is noted as Tibetan by Boissier, but I have seen no specimens. It is a tall form with broad leaves. Boissier describes the branches of the panicle as rough in *alba*, but they are smooth in all Indian specimens. Wight's n. 1746 has a minute palea.

2. **A. verticillata,** *Vill. Fl. Delph.* 74; leaves scabrid, ligule very short truncate, panicle ovate or oblong contracted or expanded dense fld., branches scabrid, spikelets $\frac{1}{12}$ in., gls. I and II subequal subacute scaberulous keels strongly scabrid, III about $\frac{1}{3}$ shorter not awned tip truncate toothed, palea nearly = gl., callus quite glabrous. *Ledeb. Fl. Ross.* iv. 438; *Boiss. Fl. Orient.* v. 513; *Trin. Diss.* i. 195, *Sp. Gram. Ic.* t. 36; *Reichb. Ic. Fl. Germ.* t. 35. A. adscendens, *Lange in Kjoeb. Vidensk. Meddel.* (1860) 33. A. anatolica, *C. Koch. in Linnæa*, xxi. (1848) 379. A. densa, *Bieb. Fl. Taur. Cauc.* i. 56. A. diffusa, *Bess. Prim. Fl. Gallic.* i. 68. A. Muelleri, *Presl Bot. Bemerk.* 120. A. refracta, *Moench. Meth. Suppl.* 60. A. stolonifera, *Linn. Herb. non Sm.*; *Bieb. l. c.* iii. 62 (*ex Ledeb. l. c.* 439). A. Villarsii, *Poir. Encycl. Suppl.* i. 251.

The PANJAB; Hursa, *Aitchison.* KASHMIR; Chittapani Valley, *Levinge.* SIMLA, alt. 2–4600 ft. (*Griseb.*).—DISTRIB. N. temp. regions.

Stem long slender creeping, then ascending to 10–15 in. high. *Leaves* rather

broad. *Panicle* 2–3 in., lobed, branches very short with densely fastigiate branchlets, and crowded very shortly pedicelled green spikelets.—Described as annual by Grisebach in Ledeb. Fl. Ross., but as perennial by other authors.

3. **A. subaristata,** *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. (1882), 192, t. 29; leaves scabrid, ligule long, panicle elongate contracted or subeffuse, branches short scaberulous, spikelets $\frac{1}{12}$ in., gl. I and II subequal scaberulous tips aristulate, keels scabrid, III about $\frac{1}{3}$ shorter, tip truncate toothed, awn 0 or minute, palea nearly as long as the gl., callus quite glabrous. *Boiss. Fl. Orient.* v. 514.

KASHMIR, *Falconer*; at Sreenuggur and Nowgunji, alt. 5–6000 ft., *Clarke.*—DISTRIB. Affghanistan.

Stem long creeping and rooting below (as in *vulgaris*) then ascending, stout or slender. *Panicle* 3–6 in., dense- or lax-fld., branches flowering to the base. *Spikelets* pale, very shortly pedicelled, often densely packed. *Gl.* I and II membranous, with the median nerve sometimes produced into a very short awn; III dorsally awned in Affghan specimens.—Apparently a very distinct species, strongly resembling *A. vulgaris* in habit; the awned gl. I and II are found in no other Indian species. The Affghan specimens have larger and more scabrid subhispid spikelets.

4. **A. peninsularis,** *Hook. f.*; tall, very slender, erect, leaves very narrow strict, ligule short, panicle as broad as long very lax and open, branches 2–4-nate and branchlets long capillary simple in the lower half or more then very sparingly branched and few-fld., spikelets $\frac{1}{8}$ in., gl. I and II subequal, III nearly = II strongly 4-nerved tip truncate 2-aristulate, awn basal exserted, callus very shortly bearded, palea = gl. III lanceolate 2-nerved, anther as long as the gl. A. Hookeriana, *Herb. Wight.*

DECCAN PENINSULA, *Wight* (*Cat.* n. 1746, *in part*); ? Pulney Mts., *Wight.*

Stem 2 ft. or more, erect from the very base, stiff, leafy upwards. *Leaves* flat, 3–4 by $\frac{1}{6}$ in., erect, finely acuminate, nearly smooth. *Panicle* 3–4 in., branches in distant whorls, perfectly smooth. *Spikelets* green or purple. *Anthers* very large, purple, tips of cells almost beaked.—The Pulney plant has narrower more acuminate gl. I and II than the others, and III is shorter in proportion, but it is otherwise identical; its stamens are imperfect. Closely resembles *Calamagrostis pilosula.*

** Palea short or 0.

† *Gl. III awned.*

5. **A. canina,** *Linn. Sp. Pl.* 62; radical leaves narrow convolute cauline very narrow, ligule oblong, panicle oblong or ovate spreading in fl. contracted in frt., branches lax-fld., spikelets $\frac{1}{12}$–$\frac{1}{10}$ in., gl. I and II unequal lanceolate acute or acuminate, III $\frac{1}{4}$ shorter tip truncate 4-toothed, awn median to basal, palea 0, callus glabrous, anthers long. *Kunth Enum. Pl.* i. 222; *Host Gram. Austr.* iv. t. 53; *Engl. Bot.* t. 1856; *Knapp Gram. Britt.* t. 21; *Reichb. Ic. Fl. Germ.* t. 33; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 29; *Duthie Grass. N.W. Ind.* 29; *Ledeb. Fl. Ross.* iv. 440; *Boiss. Fl. Orient.* v. 516. Trichodium caninum, *Schrad. Fl. Germ.* i. 198. Agraulus caninus, *Beauv. Agrost.* 5, t. 4, f. 7.

WESTERN HIMALAYA and WESTERN TIBET; Kashmir, alt. 9–12,000 ft., *Clarke, Duthie*; Lahul, *Hay.* NILGHIRI HILLS, alt. 8000 ft., *Clarke* (introd. ?).—DISTRIB. N. temp. regions.

Stem 1–2 ft. very slender, rarely stoloniferous. *Leaves* $\frac{1}{16}$–$\frac{1}{10}$ in. broad. *Panicle* 2–4 in.; branches capillary, scaberulous or nearly smooth. *Spikelets* green, pale or purple; awn exserted, geniculate; callus sometimes minutely scabrid.—There are upwards of 30 recorded synonyms of this plant.

6. **A. brachiata,** *Munro mss.*; tall, very slender, leaves long, ligule very small, panicle effuse, branches branchlets and pedicels capillary divaricate, spikelets $\frac{1}{16}$ in. few distant very long-pedicelled, gl. I and II subequal oblong subacute, III nearly as long narrowly truncate, callus quite glabrous, awn median.—Sporobolus, *Wall. Cat.* n. 3769 B.

Behar; at Monghyr, *Wallich.*

Stem 2–3 ft. high or more, as slender as a sparrow's quill, weak and probably decumbent on bushes, internodes 6 in. long. *Leaves* 6–8 by $\frac{1}{6}$–$\frac{1}{4}$ in., finely acuminate, contracted towards the base, thin and flaccid. *Panicle* 6–12 in., quite smooth, branches 2–2½ in. long, opposite or in distant whorls of 3–5, horizontal; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in. *Gl.* I and II equal, cymbiform; III as long as I and II, 5-nerved, mid-nerve reaching half way up; palea minute. *Grain* oblong, compressed, as long as the gl.—An extraordinarily delicate species, quite unlike any other and more resembling a *Sporobolus.* The specimens are advanced, in frt., and I have seen no awn, or any other indication of one except the shortened median nerve.

7. **A. filipes,** *Hook. f.*; very slender, leaves short very narrow, ligule very short, panicle very narrow elongate, branches short alternate and 2–3-nate erect smooth, spikelets $\frac{1}{14}$–$\frac{1}{12}$ in. shortly pedicelled erect, gl. I and II unequal acute, III $\frac{1}{3}$ shorter tip truncate nearly entire, callus quite glabrous, awn dorsal from above the middle geniculate, palea minute.

Khasia Hills, alt. 5–6000 ft., in several places, *Clarke.*

Stem 8–15 in., erect or geniculate below, densely tufted, base hard. *Radical leaves* many, tufted, 1–2 in., subulate, cauline rather longer and broader. *Panicle* 2–4 in., interrupted; branchlets $\frac{1}{4}$–$\frac{3}{4}$ in., capillary, shortly naked below, smooth. *Spikelets* green or pale reddish; gl. I and II with scabrid keels; awn shortly exserted. *Anthers* very short. *Grain* ovoid, acute.—Nearest to *A. canina,* but the long very narrow interrupted panicle is constant in all the specimens from five distant localities at different elevations.

Var. ? palea 0, grain linear-oblong. A. nervosa, *Nees, var.* aristata, *Munro in Herb.* Kew.—Sikkim; at Lachoong, alt 9000 ft.

8. **A. Hookeriana,** *Clarke mss. (non Munro)*; very slender, leaves very narrow flaccid, ligule oblong, panicle broad with rather distant whorls of few very long flexuous capillary branches naked and unbranched for half their length, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I and II unequal lanceolate acuminate, III about $\frac{1}{3}$ shorter tip truncate denticulate, callus glabrous or minutely hairy, awn dorsal.

Sikkim Himalaya, alt. 9–11,000 ft., in meadows, *J. D. H. Cummins* (in Herb. *Clarke*).

Stem 1–2 ft. *Leaves* 2–6 in., flat, $\frac{1}{12}$ in. broad. *Panicle* 2–6 in., branches 2–3 in., minutely scaberulous; pedicels as long as the spikelets or longer. *Spikelets* green, rather distant; awn exserted; callus sometimes distinctly but minutely bearded. *Anthers* linear. *Grain* oblong.—Spikelets very much larger than in the foregoing species. This is not *A. Hookeriana,* Munro ex Duthie Grass. N.W. Ind. 30, nor *Lachnagrostis Hookeriana,* Nees ex Steud. Syn. Gram. 192.

†† *Gl. III not awned.*

9. **A. micrantha,** *Steud. Syn. Gram.* 70; tall, rather slender, leaves narrow, ligule oblong, panicle elongate inclined contracted in fl., branches long capillary smooth spreading in fruit, spikelets $\frac{1}{16}$–$\frac{1}{12}$ in., gl. I and II unequal oblong-lanceolate acute, III $\frac{1}{4}$–$\frac{1}{3}$ shorter tip truncate crenate callus

quite naked, nerves very faint, palea = about ¼ gl., anthers about ⅓ gl.—*A. Wightii, Munro in Herb. Hook. f. & T. in part*).—Agrostis, *Wall. Cat.* n. 3776.

CENTRAL HIMALAYA, alt. 4–6000 ft., from Garwhal to Sikkim. ?KHASIA HILLS, alt. 5000 ft., *Clarke.*

Stem 2–3 ft., tufted, rather stout below in Wallich's specimens. *Leaves* 3–6 in., by $\frac{1}{10}$–$\frac{1}{6}$ in., rarely broader, scaberulous. *Panicle* 4–10 in., lax-fld., slightly scaberulous, branches naked till towards the tips, lower whorled or fascicled; top of pedicels clavate. *Spikelets* green, gl. III 5-nerved, nerves all very slender or evanescent, the median sometimes arrested half way. *Grain* linear-oblong.—Steudel describes the palea as long as the gl., but it never exceeds ¼ of that organ. The Khasian specimens have a much reduced panicle and much smaller palea.

10. **A. myriantha,** *Hook. f.*; stems stout leafy, leaves broadly linear-lanceolate, ligule short, panicle 4–12 in. inclined contracted many- and dense-fld., rachis rather stout, branches fascicled or whorled often flg. to the base, spikelets $\frac{1}{20}$–$\frac{1}{10}$ in., gl. I and II subequal oblong subacute, III nearly as long tip truncate crenate, nerves very faint, callus quite naked, palea = ¼–⅓ gl., anthers ⅓–⅔ gl.—Agrostis, n. 7 *Herb. Hook. f. & T.*

SIKKIM HIMALAYA; alt. 9–12,000 ft., common. Khasia Hills, alt. 4–6000 ft., common.

Stem 1–5 ft., suberect or geniculate below. *Leaves* 4–12 by ⅛–1½ in., scaberulous. *Panicle* 6–12 in., contracted in flower, less so in frt.; branches very many in many fascicles, strict, erect, sometimes naked for half their length. *Spikelets* pale green, or brownish shortly pedicelled; gl. I and II scaberulous on the keels; III 5-nerved, nerves anthers palea and grain as in *A. micrantha.*—Very near *A. micrantha,* but a much more leafy species, with shorter and broader gl. I and II, and III longer in proportion.

Var. *sikkimensis*; stem 1–2 ft., leaves 4–8 by ⅛–⅙ in., ligule oblong, anthers = ⅓ the gl.—Sikkim, common in woods.

Var. *khasiana*; stem 3–5 ft., sometimes as thick as a goose-quill below, leaves 6–12 by ¼–½ in., ligule often 0, panicle up to 12 in., anthers = ⅔ the gl.—Khasia Hills, abundant.

11. **A. Clarkei,** *Hook. f.*; very slender, leaves very narrow, ligule short, panicle broadly pyramidal, branches capillary spreading sparingly divided, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in., gl. I and II very unequal narrowly lanceolate acuminate, III much shorter than II 5-nerved nerves slender, tip truncate crenate, callus quite glabrous, palea very minute or 0. A. canina, *Munro in Herb. Ind. Or. Hf. & T.* (*in part*).

WESTERN HIMALAYA; *Herb. Royle*; Sikkim, alt. 9–11,000 ft., *J. D. H., Clarke, Cummins.*

Stem 6–14 in., suberect. *Lowest leaves* filiform, upper flat, all very narrow, scaberulous. *Panicle* 1½–7 in., branches spreading in fl. and frt., smooth or nearly so, naked below, lower geminate or in whorls of 3–5. *Spikelets* narrow, green purplish or very dark purple; gl. I ¼ or more longer than II, very finely acuminate, keel scabrid; III short and broad.—Regarded by Mr. Clarke as an awnless form of *A. canina,* but besides wanting the awn, gl. I and II are narrower and more acuminate, and III much shorter.

12. **A. inæquiglumis,** *Griseb. in Goett. Nachr.* (1868) 80; stems 4–6 in. densely tufted stiff stout, leaves filiform or nearly so, ligule short, panicle spiciform dense-fld., branches very short, spikelets $\frac{1}{14}$–$\frac{1}{10}$ in., gl. I and II unequal ovate-lanceolate acute, III ¼ shorter than II tip narrowly

truncate crenate, callus quite naked, palea minute or 0, anthers short. Agrostis n. 10, *Herb. Ind. Or. Hook. f. & Thoms.*

Sikkim Himalaya; alt. 12–16,000 ft., *J. D. H., Clarke,* &c.

Stem 4–6, rarely 8 in. *Leaves* usually convolute, upper sometimes flat, not $\frac{1}{12}$ in. broad; lower sheaths green or purple. *Panicle* 1–2 in., strict, branches stout densely imbricating, flg. to the base. *Spikelets* very shortly and stoutly pedicelled, green or dark purple.—A very common alpine grass, constant in habit at all elevations.

13. **A. divaricata,** *Griseb. in Goett. Nachr.* (1868) 82; stems 4–6 in. densely tufted capillary, leaves capillary, panicle small with widely spreading divaricate sparingly divided branches and capillary pedicels, spikelets $\frac{1}{18}$–$\frac{1}{16}$ in., gl I and II very unequal ovate-lanceolate, I acute, II acuminate, III about $\frac{1}{4}$ shorter than II tip truncate crenulate, nerves very faint, callus quite glabrous, palea most minute orbicular, anthers short. *Herb. Ind. Or. Hf. & T. No.* 11.

Sikkim Himalaya, Yeumtong, on moist banks, alt. 13,000 ft., *J. D. H.*

The most delicate little species known to me, resembling *Aira caryophyllea* in size and slenderness, but growing in dense tufts. *Leaves* about 1 in., convolute, flexuous; ligule short, oblong. *Panicle* about 1 in. long and broad, branches geminate, quite smooth. *Spikelets* remote, purple, keels of gl. I and II scabrid, pedicels rather long. *Grain* oblong.—A single specimen of a Sikkim *Agrostis* in Herb. Calcutta (n. 663 in part) without further habitat, resembles this in the small stature and panicle, but has a much stouter stem, and flat leaves about $\frac{1}{10}$–$\frac{1}{18}$ in. gl. I and II are more obtuse. More specimens of both are much wanted.

DOUBTFUL SPECIES.

A. nervosa, *Nees ex Trin. in Mem. Acad. Peterb. Ser.* VI. vi. II (1845) 328; *Steud. Syn. Gram.* 165; *Duthie Grass. N.W. Ind.* 30; leaves flat, ligule very short, panicle 4 in. lower branches 4-nate naked below, gl. I and II subequal hardly $\frac{1}{12}$ in. acute, III $\frac{1}{3}$ shorter, awn 0, palea rather shorter than the ovary, callus very shortly retrorsely pilose.—Nepal. (See *Calamagrostis pilosula*).

A. procera, *Retz. Obs.* iv. 19. ? *Thysanolæna Agrostis.*

A. Wightii, *Nees ex Steud. l. c.* 168; leaves flat margins scabrous, ligule ovate, panicle long capillary, branches 2–4-nate, branchlets 2–3-chotomous scabrid, gl. I and II equal subobtuse, keel scabrid III = II 3-denticulate, palea rather longer than the ovary ovate-lanceolate acute. Vilfa vulgaris, *Wight Herb.* 78 (ex Steud.).

A. Zenkeri, *Steud. l. c.* 170; stem exceedingly slender scaberulous above, leaves 1-1½ in. erect strict convolute retrorsely scabrid, ligule obtuse, panicle pyramidal, rays 2-nate widely spreading, spikelets 1½ line purple, gl. I and II equal acute, III as long shortly denticulate 5-nerved awn 0, palea as long 2-nerved, callus hairy all over.—*Nilghiri Hills.*

73. MUEHLENBERGIA, *Schreb.*

Annual or perennial very slender grasses. *Leaves* narrow, flat. *Spikelets* very numerous and minute, 1-fld., panicled, terete, not jointed on their pedicels; rachilla jointed at the base, not produced. *Glumes* 3, I and II persistent, equal or unequal, 1-nerved; III as long or longer than I and II, terete, membranous, 3-nerved, hairy below the middle, tip

acute or minutely 2-toothed awned, awn very slender not twisted; palea oblong, as long as the gl. or longer, 2-nerved, nerves almost meeting in the tip; callus minute. *Lodicules* 2, very minute. *Anthers* short or long. *Styles* free, stigmas short. *Grain* cylindric, free in the gl. and palea.—Species about 60 chiefly temp. American.

The above character applies to the Indian species; of the American some have only one empty gl., in others gl. III is awnless or 5-nerved.

1. **M. sylvatica**, *Torr. & Gr. ex Trin. in Mem. Acad. Petersb. Ser.* VI. vi. II. (1845) 292 (*excl. syn. viridissima*); panicle erect contracted interrupted, branches very short flg. to the base, spikelets very shortly pedicelled, gl. I and II $\frac{1}{12}$–$\frac{1}{10}$ in. lanceolate acuminate, III about as long, awn $\frac{1}{6}$–$\frac{1}{2}$ in. *Steud. Syn. Gram.* 179; *A. Gray Man. Bot. N. U. St.* 612, t. 8; *Duthie Grass. N.W. Ind.* 28. M. Duthiæana, *Hack. in Herb. Duthie.* Agrostis diffusa, *Muehlb. Descr. Gram.* 64. A. sylvatica, *Torrey Fl. N. Am.* i. 87 (*non Linn.*).

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4–9000 ft., *Royle*, &c.—DISTRIB. Japan, N. Am.

Stem 1–3 ft., very slender, branched, decumbent and creeping below. *Leaves* 3–5 by $\frac{1}{10}$–$\frac{1}{6}$ in., smooth or scaberulous; ligule very short, lacerate. *Panicle* 4–6 in., pale green or violet; rachis and very short erect branches and pedicels scabrid. *Spikelets* crowded, erect; gls. I and II subequal, 1–3-nerved, keels scabrid; III minutely notched at the tip, hairs much shorter than the gl.; palea about as long as its gl.

2. **M. viridissima**, *Nees ex Steud. Syn. Gram.* 178; panicle elongate much fastigiately branched flexuous interrupted branches and pedicels slender, gls. I and II $\frac{1}{20}$–$\frac{1}{16}$ in. equal or unequal, III twice as long or longer, awn $\frac{1}{3}$–1 in. *Duthie Grass. N.W. Ind.* 28. M. Huegelii, *Trin. in Mem. Acad. Petersb. Ser.* VI. vi. II. (1845) 293. M. geniculata, *Nees ex Steud. Syn. Gram.* 178; *Duthie l. c.*—Podosaemum, *Wall. Cat.* n. 3778.

TEMPERATE HIMALAYA, alt. 3–9000 ft., from Kashmir to Sikkim and the KHASIA HILLS.

Habit of *M. sylvatica*, but usually a larger grass, with longer broader leaves and a loose interrupted flexuous bright green panicle often a foot long. *Spikelets* shortly pedicelled; gls. I and II very variable, both ovate-lanceolate 1-nerved and shortly awned with scabrid keels and awn, or I much smaller oblong or orbicular erose and nerveless.

3. **M. himalayensis**, *Hack. in Herb. Duthie* n. 10,128; panicle elongate much fastigiately branched interrupted, branches and pedicels slender, gls. I and II $\frac{1}{8}$–$\frac{1}{6}$ in. subequal lanceolate acuminate or subaristate, III as long as I and II or rather longer, awn $\frac{1}{2}$–1 in.

WESTERN HIMALAYA, alt. 6–7000 ft., from Chamba to Simla, *Thomson*, *Madden*, &c.

Stem 12–18 in., very slender, decumbent or ascending, branched. *Leaves* narrow, flaccid; ligule oblong. *Panicle* 3–6 in., very narrow, slender, flexuous, flaccid, branches distant. *Spikelets* bright green, glistening, larger than in *sylvatica* and *viridissima* to which latter it is most nearly allied, differing in being more slender with narrower leaves, in the laxer, fewer fld. panicle, in the larger spikelets, and in gl. III not being much longer than I and II.

74. **CALAMAGROSTIS**, *Adans.*

Stout or slender grasses. *Leaves* narrow. *Spikelets* in narrow or effuse panicles, 1-fld., not jointed on the pedicels; rachilla jointed at the base, not produced beyond gl. III. *Glumes* 3, I and II equal or unequal, lanceolate, acuminate, glabrous or scaberulous; III shorter, hyaline, truncate, crenate or cleft, glabrous or hairy, awned, paleate; palea often minute, rarely 0; callus bearded with long or short hairs.—Species about 15? natives of cold and temp. climates.

See remarks under *Agrostis* (p. 253). See also *Deyeuxia abnormis*, which is intermediate between that genus and *Calamagrostis*.

* Glume III glabrous.

† Hairs of callus longer than gl. III.

§ *Glume III dorsally awned at the middle or below it.*

1. **C. epigejos,** *Roth. Tent. Fl. Germ.* i. 34; stem stout creeping below, leaves glaucous scaberulous, ligule long acute, panicle dense, branches scaberulous, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in., gl. I and II subequal subulate-lanceolate, III = $\frac{1}{3}$ II tip 2-fid, awn dorsal at or near the middle, palea = $\frac{1}{2}$–$\frac{2}{4}$ gl. III, hairs of callus as long as gls. I and II. *Kunth Enum. Pl.* i. 237, *Suppl.* 184; *Host Gram. Austr.* iv. 24, t. 42. *Reichb. Ic. Fl. Germ.* t. 43; *Ledeb. Fl. Ross.* iv. 432; *Boiss. Fl. Orient.* v. 525; *Duthie Grass. N.W. Ind.* 30. C. georgica & thyrsoides, *C. Koch in Linnæa*, xxi. (1848) 387, 388. C. glomerata, *Boiss. et Bühse in Mem. Soc. Nat. Mosc.* xii. (1860) 229. C. lithuanica & vilneensis, *Schult. Mant.* iii. 602. C. lanceolata, *Stokes in With. Arr. Brit. Pl. Ed.* III. ii. 122. C. glauca & Huebneriana, *Reichb. Fl. Germ. Excurs.* 27, *Ic. Fl. Germ.* t. 43. C. rigens, *Fries Summ. Veg. Scand.* 240. Arundo epigejos, *Linn. Sp. Pl.* 81; *Engl. Bot.* t. 402; *Fl. Dan* t. 2165; *Knapp Gram. Britt.* t. 97.

Kashmir, alt. 8–14,000 ft., *Falconer*, &c.—Distrib. N. Asia. Europe. S. Africa.

Stem 2–4 ft., erect, usually stout. *Leaves* long, narrow, finely acuminate, scaberulous, more or less glaucous; ligule oblong, rather long, acute. *Panicle* 6–12 in. or more, oblong or lanceolate, much branched, branches usually erect. *Spikelets* shortly pedicelled, erect, green or light or dark purple; gl. I and II subequal or II the longest, 1-nerved or II 3-nerved, keel and often margins scaberulous; III glabrous, smooth or scaberulous, awn equalling its gl.

2. **C. decora,** *Hook. f.*; stems tall tufted very slender, leaves very long flat, panicle loosely branched, spikelets $\frac{1}{5}$ in., gls. I and II subequal lanceolate, scaberulous, III = $\frac{2}{3}$–$\frac{3}{4}$ I truncate 4-cuspidate, awn subbasal exserted, palea as long as the gl., callus hairs rather longer than gl. III.

Kashmir; Astor Valley, alt. 9–10,000 ft., *Duthie* (n. 12,660).

Stem 4–5 ft. or more. *Leaves* 12–18 by $\frac{1}{4}$ in., scaberulous, pale green; sheath smooth; ligule large, oblong, rounded. *Panicle* 3–8 in., pale green, rachis slender and fascicled branches scaberulous, branches naked below. *Spikelets* shortly pedicelled, suberect; gls. I and II hardly membranous, finely acuminate, keels scaberulous, I 3-nerved; III glabrous, except the callus; awn shortly exserted. *Anthers* linear.

§§ *Glume III awned in the upper third or tip.*

3. **C. emodensis,** *Griseb. in Goett. Nachr.* (1868) 80; stem stout creeping below, leaves long broad flat glaucous scaberulous, panicle dense or effuse much-branched, spikelets ¼ in. crowded, gl. I and II unequal subulate-lanceolate, III = ½ I cleft to about the upper ⅓ awned in the cleft, awn exserted, palea = ⅔–¾ its gl. C. nepalensis, *Herb. Strach. & Winterb. (in part).* Calamagrostis, *Wall. Cat.* n. 3781 B.

TEMPERATE HIMALAYA, alt. 7–12,000 ft., from Kashmir to Bhotan, *Falconer*, &c.

Stem 3–5 ft., as thick as a goose-quill below. *Leaves* 12–18 by ½–⅔ in., thinly coriaceous, pale glaucous green, many-nerved; sheath nearly smooth or scaberulous; ligule oblong, membranous. *Panicle* 6–10 in., inclined or nodding, very soft, shining and silky, pale grey; branches branchlets and very short pedicels capillary, smooth, or minutely scaberulous. *Glumes* I and II very thin, smooth, keels scaberulous, I 1-nerved; II 3-nerved; III glabrous, hyaline, usually cleft from the upper third into two lanceolate subulate-acuminate lobes; but the lobes are sometimes irregularly lacerate at the tip; nerves 5, faint.

4. **C. littorea,** *DC. Fl. Franc.* v. 255; stem stout or slender creeping below, leaves narrow scaberulous often convolute, ligule oblong, panicle dense or effuse, spikelets ⅙–¼ in., gl. I and II unequal subulate-lanceolate scaberulous, III = ½-⅔ I tip truncate erose or toothed, awn terminal in a notch or short cleft or dorsal below the tip included, palea nearly as long as the gl. *Kunth Enum. Pl.* i. 237; *Reichb. Ic. Fl. Germ.* t. 42; *Boiss. Fl. Orient.* v. 524; *Steud. Syn. Gram.* 187. C. glauca, *Reichb. Fl. Germ. Excurs.* 27. C. lanceolata, *Aitchis. in Journ. Linn. Soc.* xviii. (1880) 107 (*non Roth.*). C. laxa, *Host Gram. Austr.* iv. 25, t. 43; *Ledeb. Fl. Ross.* v. 432; *Herb. Ind. Or. Hf. & T. (in part)*; *Griseb. in Goett. Nachr.* (1868) 80. C. nepalensis, *Nees ex Steud. Syn. Gram.* 193; *Duthie Grass. N.W. Ind.* 30; *Aitchis. in Trans. Linn. Soc. Ser. II. Bot.* iii. 124. Arundo glauca, *M. Bieb. Fl. Taur. Cauc.* i. 79. A. laxa, *Roem. & Sch. Syst.* ii. 502. A. littorea, *Schrad. Fl. Germ.* i. 212, t. 4, f. 2.—Calamagrostis, *Wall. Cat.* n. 3781 A.

TEMPERATE HIMALAYA, alt. 6–10,000 ft. from Kashmir to Sikkim. WESTERN TIBET, alt. 10–12,000 ft.—DISTRIB. Europe, N. and W. Asia.

Stem 2–5 ft., erect, as thick as a crow-quill or small goose-quill, but sometimes very slender. *Leaves* 12–18 by $\frac{1}{12}$–⅙ in, firm, smooth or scaberulous, flat or convolute; sheaths smooth; ligule linear-oblong. *Panicle* very variable in form and composition, erect or inclined, green or purple, rachis and branches scaberulous. *Spikelets* rarely ¼ in. long, sometimes only ⅛ in., when the outer glumes are broader; gl. I and II with scaberulous keels, I usually about ¼ longer than II, but sometimes subequal, I 1-nerved and II 3-nerved at the base, but both sometimes 3-nerved; III glabrous, smooth or faintly scaberulous, faintly 5-nerved; awn very slender, variable in length, rarely longer than its gl.—A very difficult plant to define satisfactorily so much do the spikelets vary in size, in the breadth of the empty gls., and in the incision of the top of gl. III, which is either rounded and obtusely 2-toothed with an awn in the sinus, or truncate with a terminal awn, or 2-lobed nearly ¼ way down with lobes irregularly incised and the awn in the sinus, or finally the awn may be strictly dorsal below the truncate tip. Dr. Stapf, who has revised the whole of the Indian material which I had referred to this species, confirms the above view of its variation, and agrees with me in referring it to the European *C. littorea.*

Var. *tartarica*; stem shorter stouter, leaves convolute, panicle strict narrowly

oblong dense-fld., spikelets usually dark purple. C. tartarica, *Jacquem. mss.* C. laxa, var. robustior, *Herb. Hf. & T.*—Common in the drier districts especially in Western Tibet.

5. **C. Stolizkai,** *Hook. f.*; stem short stout, leaves erect convolute, panicle short oblong contracted dense, spikelets $\frac{1}{6}$ in. shortly pedicelled, gl. I and II subequal lanceolate acuminate scaberulous, III about $\frac{1}{3}$ shorter than II tip truncate 4-aristulate, awn terminal exserted, palea as long as its gl., hairs of callus rather longer than gl. III shorter than I and II.

WESTERN TIBET; Zanskar, on the Pensi-la, alt. 12–15,000 ft., *Stolizka.*

Stem 18–24 in., erect. *Leaves* 3–6 by $\frac{1}{6}$–$\frac{1}{4}$ in., very scabrid above; sheaths scaberulous; ligule oblong. *Panicle* 4 in.; branches short, erect or suberect, scabrid. *Spikelets* erect, crowded, pale, shining; gl. I and II hyaline, sub 3-nerved; III glabrous, hairs of callus unequal in length; awn about twice as long as the spikelet, straight, shortly exserted.—I have seen only two specimens.

6. **C. debilis,** *Hook. f.*; very slender, leaves short very narrow, panicle narrow, branches few rather short laxly flowering and pedicels capillary, spikelets $\frac{1}{6}$ in. pale, gls. I and II unequal lanceolate acuminate keels quite smooth, III about $\frac{1}{3}$ shorter than II or less, tip truncate erose, awn dorsal in upper third of the gl. exserted, palea as long as its gl., hairs of callus = gl. I and II.

SIKKIM HIMALAYA; Chola, alt. 11,000 ft., *J. D. H.*

Stem 12–18 in., tufted, geniculate below. *Leaves* distant, 1–2 by $\frac{1}{16}$–$\frac{1}{12}$ in., flat, quite smooth, upper shorter spreading; sheath smooth; ligule oblong. *Panicle* 2–5 in., branches and branchlets smooth. *Spikelets* pale purplish brown, long-pedicelled; gl. I and II 1-nerved; III glabrous, 5-nerved. *Anthers* very small.—I found this very delicate species only once and then late in the season, the very small anthers are peculiar.

†† Hairs of callus much shorter than gl. III.

7. **C. tripilifera,** *Hook. f.*; very slender, leaves short narrow flat, panicle of few very long wide spreading 2–3-nate branches sparingly divided towards the ends, spikelets $\frac{1}{6}$ in. long-pedicelled, gls. I and II subequal lanceolate acuminate, III firm $\frac{1}{3}$ shorter than I tip truncate with 2 short lateral awns and a median dorsal exserted awn, palea $\frac{1}{3}$ shorter than its gl., hairs of callus very unequal.

SIKKIM HIMALAYA; in the drier interior, alt. 10–13,000 ft. *J. D. H.*, *Clarke*, *King's Collector.*

Stem tufted, 8–18 in., erect, hardly thicker than pack-thread. *Leaves* 4–6 by $\frac{1}{10}$–$\frac{1}{6}$ in., rather flaccid, quite smooth; sheaths smooth; ligule oblong. *Panicle* with few whorls of few quite smooth capillary branches 1–2 in. long each bearing 3–5 glistening pale yellow on dull purplish spikelets on pedicels longer than themselves; gls. I and II 1-nerved, quite smooth, even the keels; III glabrous, rather strongly 4-nerved, tip with mucros between the lateral and middle awns, the latter of which is stiff and nearly twice as long as its gl.; callus hairs nearly half as long as gl. III.

Var. *Cumminsii*; panicle contracted, branches much stouter appressed to the rachis, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in.—N.E. Sikkim, *Cummins.*—Perhaps a different species, but the stems, about a span long, being curved in a semicircle, show that the plant has grown under unfavourable conditions.

** Glume III hairy all over; callus hairs shorter than gl. III.

† *Palea of gl. III nearly as long as its gl.*

8. **C. Munroana,** *Boiss. Fl. Orient.* v. 523; very slender, leaves long narrow, panicle effuse or contracted, spikelets $\frac{1}{16}$–$\frac{1}{10}$ in., gls. I and II subequal oblong-lanceolate acute 1-nerved, keels nearly smooth, III = $\frac{3}{4}$ I broadly truncate crenate, awn short infra-median included or 0, callus shortly hairy, anthers short. Agrostis ciliata, *Herb. Strachey & Winterbottom*; *Herb. Ind. Or. Hf. & T. in part*; ?*Duthie Grass. N.W. Ind.* 29 (*non Nees*). A. Munroana, *Aitch. & Hemsl. in Journ. Linn. Soc.* xix. (1882) 192. A. pilosula, *Hack. in Herb. Duthie* n. 6231 (*non Trin.*). A. Royleana, *Duthie l. c.* 30.

WESTERN HIMALAYA, from Kashmir to Kumaon, alt. 8–12,000 ft., *Royle*, &c. —DISTRIB. Affghan.

Stems 6–18 in., tufted, roots fibrous. *Leaves* 2–8 in., scaberulous or nearly smooth, flaccid, or in high altitudes strict; sheaths nearly smooth; ligule variable. *Panicle* 2–5 in., oblong or pyramidal; branches capillary, erect or spreading, lower fascicled or 2–3-nate, smooth or minutely scaberulous, lower often long spreading and naked below. *Spikelets* pedicellled, green or purplish; gl. I and II very thin, smooth; III hairy all over; palea as long as its gl. or $\frac{1}{4}$ shorter.—A very variable plant, one of two (the other is *C. pilosula*) which have been referred by Munro and others to *Agrostis Royleana*, Trin., a plant described by Trinius as having the bearded rachilla proper to *Deyeuxia* (see end of genus). I have in vain sought to identify *Munroana* with any other of the Roylean species, none of which are accurately described.

Var. *stricta*; stem 6–10 in. strict, leaves very narrow rather stiff erect, panicle contracted, branches short erect or spreading, pedicels very short, spikelets green or purple, gl. III always awned. Agrostis No. 4, *Herb. Strach. & Winterb.*—Common at altitudes of 11–15,000 ft. Though differing entirely in habit from the lax open panicled form of *Munroana*, I feel sure that this is only the alpine form of that plant from intermediates occurring between them. It resembles *Agrostis inæquiglumis*, Griseb.

9. **C. Griffithiana,** *Hook. f.*; tall, erect, leaves long narrow subcoriaceous, panicle long narrow branches suberect, spikelets $\frac{1}{8}$ in., gl. I and II subequal lanceolate acute, III narrow tip truncate with 4 short bristles the lateral longest, awn subbasal to median exserted, hairs of callus very short, anthers linear. C. Hookeriana, var. aspera, *Munro in Herb. Hf. & T.* Agrostis Royleana, *Munro in Herb. Strach. & Winterb.* n. 2. Lachnagrostis Griffithiana, *Munro Cat. Pl. Griff. Falc.* &c. 67 *ined.* Deyeuxia Griffithii, *Munro l. c.* 56.

WESTERN HIMALAYA; Kumaon, alt. 5500 ft., *Strachey & Winterb.* KHASIA HILLS, alt. 5000 ft., *Griffith* (*Kew distrib.* n. 6598), *Hf. & T.* &c.

Stem 2–3 ft., quite erect, as thick as a crow-quill. *Leaves* 6–10 by $\frac{1}{8}$–$\frac{1}{6}$ in., and sheaths smooth or subscaberulous; ligule very short. *Panicle* erect; branches 2–4 in., 2–5-nate, naked for half their length, then with crowded branchlets and shortly pedicelled green or purplish spikelets. *Spikelets* $\frac{1}{8}$ in., III hairy all over; palea nearly as long as its gl.—A much taller and stouter plant than any form of *C. Munroana*, with much larger spikelets, short callus hairs, and linear anthers. A fourth imperfect gl. sometimes occurs.

†† *Palea of gl. III very short, rarely* = $\frac{1}{2}$ *its gl.*

10. **C. pilosula,** *Hook. f.*; stem very slender erect, leaves long

narrow flat, panicle effuse or contracted, branches long or short suberect or spreading, spikelets $\frac{1}{10}$–$\frac{1}{8}$ in., gl. I and II subequal oblong-lanceolate acute or acuminate 1-nerved smooth, III oblong tip truncate erose or crenate with sometimes 4 minute setulae, awn subbasal exserted, hairs of callus = $\frac{1}{3}$ gl. III or shorter, anthers linear. Agrostis pilosula, *Trin. in Mem. Acad. Petersb. Ser.* VI. vi. II. (1845) 372.

TEMPERATE and ALPINE HIMALAYA, alt. 6–14,000 ft., from Kashmir to Sikkim. NILGHIRI HILLS, alt. 3–6000 ft., *Wight, Schmid, Jacquemont*, &c. CEYLON, alt. 6–8000, *Walker*, &c.

Stems 1–3 ft. or more, tufted, 6–10 in. in alpine specimens, erect from a short inclined base. *Leaves* variable in breadth, up to $\frac{1}{4}$ in., but usually very narrow, flaccid, smooth or subscaberulous; sheath smooth; ligule very variable, longest in the upper leaves. *Panicle* very variable, large and effuse with spreading branches 1–4 in. long naked below and with loosely crowded spikelets at the extremities, or contracted with suberect shorter branches, or short broadly ovate or triangular; branches branchlets and pedicels minutely scabrid. *Spikelets* membranous, green and glistening in the larger forms, purple in others and more herbaceous in the alpine; gl. I and II smooth or subscaberulous, I rather the shortest, keels near or quite smooth, rarely scabrous; III $\frac{1}{4}$–$\frac{1}{3}$ shorter than I, hyaline, hairy all over, nerves often indistinct; palea usually very minute, rarely nearly half as long as its gl.; awn more or less exserted.—A very variable grass of which Wallich's No. 3775 A from Nepal, with spikelets $\frac{1}{12}$ in. long may be regarded as the type; his B has rather larger spikelets, but is not otherwise different. I am far from supposing that I have succeeded in unravelling its synonymy which is inextricably confused with *C. Munroana Agrostis alba* and others. The following are marked forms in their typical states as defined, but they pass into one another.

Var. *Wallichiana*; very slender, leaves narrow sometimes filiform smooth, panicle 2–3 in., branches spreading lax-fld., spikelets green or purple. Agrostis ciliata, *β*, *Nees* in *Herb. Royle*. A. Hookeriana, *Munro in Herb. Kew* (*non Steud.*). A. Neesii, *Steud. l. c.* 293. A. nervosa, var. aristata, *Munro in Herb. Hook. f. & T. & Herb. Falconer*. A. Royleana, *Duthie Grass. N.W. Ind.* 30 (*non Trin.*). A. Wallichiana, *Steud. Syn. Gram.* 174. Lachnagrostis ciliata, *Munro in Herb. Jacquem.* n. 215. L. Hookeriana, *Munro mss.* Arundinella Hookeriana, *W. & A. ex Arn. in Herb. Kew* (Ceylon).—*Agrostis Wall. Cat.* n. 3775.—*Agrostis* n. 5, *Herb. Strachey & Winterb.*—A common form.

Var. *scabra*; stem 2–4 ft. stout, leaves 6–12 by $\frac{1}{4}$–$\frac{1}{2}$ in., panicle very large effuse with long spreading horizontal capillary branches sometimes 4–5 in. long in distant whorls or fascicles, spikelets $\frac{1}{12}$–$\frac{1}{7}$ in. pale green, gl. III with the truncate tip sometimes minutely 2–4-mucronulate. Agrostis bicuspidata, *Hack. in Herb. Duthie* n. 10,088. A. Royleana, *Hack. l. c.* n. 7583. Lachnagrostis scabra, *Nees in Herb. Royle*.—In woods at about 7–10,000 ft. from Kashmir to Sikkim.

Var. *alpestris*; stem 6–18 in. strict, leaves narrow strict, panicle shorter narrow or broad, spikelets smaller $\frac{1}{12}$–$\frac{1}{10}$ in. dark purple rarely green, gls. I and II oblong-lanceolate, palea sometimes = $\frac{1}{2}$ its gl. Agrostis nervosa, *Nees in Herb. Royle*; ?*Trin. in Mem. Acad. Petersb. Ser.* VI. vi. II. (1845) 328. A. Royleana, *Nees l. c.* (*non Trin.*). A. ciliata, *β.* nervosa, *Nees in Herb. Royle*. A. Roylei, *Trin. ex Hack. in Herb. Duthie* n. 6229.—Kashmir to Sikkim, alt. 11–15,000 ft. —A common grass at high elevations.

Var. *ciliata*; panicle narrow effuse, rachis flexuous, spikelets $\frac{1}{6}$ in. shortly pedicelled pale shining, palea = $\frac{1}{4}$ its gl. Calamagrostis ciliata, *Steud. Syn. Gram.* 193. Agrostis ciliata, *Trin. l. c.* 373. Lachnagrostis ciliata, *Nees ex Steud. l. c.*—N.W. India, *Royle*. An obscure plant of which I have seen a single specimen from Herb. Royle.

11. **C. Schmidii,** *Hook. f.*; stem very slender erect, radical leaves tufted on a woody branched rootstock linear-lanceolate rigid narrowed into

a slender petiole, cauline filiform convolute, panicle short broad, branches few and long pedicels capillary, spikelets few $\frac{1}{8}$–$\frac{1}{6}$ in., gl. I and II unequal lanceolate, III truncate bicuspidate from the outer pair of nerves, awn subbasal exserted, callus hairs short, anthers linear.

NILGHIRI HILLS; Ootacamund, *Schmid.*

Rootstock as thick as a crow-quill. *Stem* filiform. *Radical* leaves 2–3 in., glabrous, nerves strong; petiole very slender stiff; sheaths of old basal leaves clothing the base of the new, lacerate, about an inch long; ligule long, linear, membranous. *Panicle* broad, rachis and few distant branches quite smooth. *Spikelets* pale purplish, gl. I and II membranous, 1-nerved, keels scaberulous; III hyaline, 5-nerved, hairy, awn twice as long as the spikelet; palea very minute, suborbicular.

I have seen only one poor specimen of this curious species, which should at once be recognized by its rootstock, and the slender rigid petioles of the leaves, long ligule, and tufted lacerate old leaf-sheaths about an inch long, crowning the rootstock. There is, however, in Herb. Kew a specimen of what may be the same species collected by Clarke at Conoor (in the Nilghiris) alt. 7000 ft., with a very slender stem 2–3 ft. long, and narrow flat sessile cauline leaves with a short ligule; its spikelets quite accord with those of *C. Schmidii*, but the base of the stem and lower leaves are wanting.

12. **C. Jacquemontii**, *Hook. f.*; tall, slender, leaves very narrow, ligule oblong, panicle narrow drooping, branches erect naked below, spikelets few $\frac{1}{5}$–$\frac{1}{4}$ in. long-pedicelled erect, gl. I and II subequal lanceolate sub 3-nerved, III = about $\frac{1}{2}$ II tip truncate 4-toothed, awn supra-basal exserted, palea minute, callus hairs = $\frac{1}{2}$ gl. III, anthers long.

KASHMIR; moist places on the Pyr Panjal, *Jacquemont* (n. 97).

Stems apparently tufted, 18 in. high, geniculate below. *Leaves* 5–6 by $\frac{1}{8}$ in., scaberulous; sheaths quite smooth; ligule oblong. *Panicle* 4–5 in., lower branches fascicled, 1–1$\frac{1}{2}$ in., scaberulous. *Spikelets* pale yellowish; keels of gl. I and II smooth, III hairy all over.—I have seen only two specimens. The long spikelets distinguish it. This approaches var. *ciliata* of *C. pilosula*, but the spikelets are considerably larger.

DOUBTFUL SPECIES.

C. HOOKERIANA, *Steud. Syn. Gram.* 292. Lachnagrostis Hookeriana, *Nees ex Steud.* A Ceylon plant described as having the palea as long as its gl. which occurs in no Ceylon specimen of the genus known to me.

C. ROYLEANA, *Steud. Nom. Ed.* II. i. 251. C. Roylei, *Steud. Syn. Gram.* 193. Agrostis Royleana, *Trin. in Act. Acad. Petersb. Ser.* VI. vi. *Sc. Nat.* II. (1845) 371. Lachnagrostis Royleana, *Nees in Herb. Royle ex Steud. Nom. l. c.* L. Hookeri, *Nees ex Steud. Syn. l. c.*—Trinius founded this species on three plants, an Indian of Royle, a Nilghiri of Zenker, and a Ceylon one from "Herb. Whytt." One of his characters is the presence of a "bearded rudiment," which refers the plant to *Deyeuxia*. I know of no *Deyeuxia* in Ceylon or the Nilghiris.

75. **DEYEUXIA**, *Clar.*

Characters of *Calamagrostis*, but with the rachilla of the spikelet produced beyond gl. III and usually penicillate with silky hairs; gl. III glabrous; hairs of callus usually short.—Species enumerated about 120.

See remarks under *Agrostis* (p. 253). In *D. Treutleri* the produced portion of the rachilla is most minute and naked, in *D. abnormis* it is awnless and the rachilla

is very minute or absent, but the hairs of the callus are more or less crowded at the base of the palea.

A. Rachilla bearded or penicillate.

* *Awn of glume III basal or subbasal.*

1. **D. sylvatica,** *Kunth Revis. Gram.* i. 77, *Enum. Pl.* i. 243, *Suppl.* 188, t. xiv. f. 5; tall, leaves long scabrid beneath, panicle contracted at length open, spikelets $\frac{1}{6}$ in., gl. I and II subequal ovate-lanceolate, III rather shorter than I tip shortly lacerate, callus loosely bearded, awn about twice as long as its gl., palea rather shorter than its gl., rachilla shortly bearded. Calamagrostis sylvatica, *DC. Fl. Fr.* v. 253; *Host Gram. Austr.* iv. 28, t. 48; *Trin. Gram. Unifl.* 223, t. 4; *Reichb. Ic. Fl. Germ.* t. 38; *Ledeb. Fl. Ross.* iv. 427; *Boiss. Fl. Orient.* v. 526. C. arundinacea, *Roth. Tent. Fl. Germ.* i. 33. C. pyramidalis, *Host l. c.* 28, t. 49; *Reichb. l. c.* Arundo sylvatica, *Schrad. Fl. Germ.* i. 218, t. 4, f. 7. Agrostis arundinacea, *Linn. Pl. Sp.* 61.

Western Himalaya; Kunawur, alt. 8000 ft., *Thomson*; Kashmir, alt. 10–11,000 ft., *Duthie.*—Distrib. Europe, Reg. Caucas.

Stem 3–5 ft., from a creeping base. *Leaves* linear, 1–2 ft. by $\frac{1}{4}$–$\frac{1}{2}$ in., finely acuminate; ligule short. *Panicle* erect or drooping; branches short, scabrid. *Spikelets* green or purplish; gl. I 1-nerved; II 3-nerved; awn of III shortly exserted.—I have seen only two Indian specimens, which I think belong to *D. sylvatica,* Kunth, one from Thomson, with a very large panicle 16 in. long has the callus hairs scanty, about $\frac{1}{3}$ the length of the gl., the other from Duthie has a shorter panicle, a much shorter rachilla, and the callus hairs are more copious and twice as long. I do not venture upon further citations than are given above, the synonymy of both *Deyeuxia* and *Calamagrostis* being in great confusion.

2. **D. elatior,** *Hook. f.*; very tall, stout, leaves long, panicle 1–2 ft. pyramidal branches long spreading, spikelets $\frac{1}{6}$ in., gl. I and II subequal lanceolate acuminate, III rather shorter than II tip truncate erose, callus laxly bearded, palea rather shorter than its gl., awn exserted, rachilla very short its hairs about half the length of the gl. or longer. Calamagrostis scabrescens, var. elatior, *Griseb. in Goett. Nachr.* (1868) 79.—Deyeuxia, *No.* 7, *Herb. Ind. Or. Hf. & T.*

Khasia Hills, alt. 5–5500 ft., *Griffith,* &c.

Stem 5–6 ft., as thick as a swan's quill below. *Leaves* 2–3 ft. by $\frac{1}{3}$–$\frac{2}{3}$ in., coriaceous, closely nerved, midrib prominent beneath, glabrous or hairy beneath; sheaths hirsute or glabrescent; ligule short, scarious. *Panicle* 4–8 in. broad when expanded; branches scabrid, lower fascicled. *Spikelets* subscaberulous; gl. I and II thin, keels and upper margin of II scabrid; III membranous, callus hairs sometimes = the gl.; awn subbasal, twice as long as its gl. *Grain* linear-oblong.—Grisebach in reducing this to a variety of *D. scabrescens,* has overlooked the great difference in size and habit, and the different position of the awn which is subbasal.

3. **D. triaristata,** *Hook. f.*; very slender, leaves narrow, panicle flexuous contracted, rachis and branches capillary, spikelets $\frac{1}{4}$ in. few, gl. I and II subequal narrowly lanceolate, III $\frac{1}{4}$ shorter than I truncate, two lateral nerves produced into long awns, two intermediate mucros, median awn exserted, palea = $\frac{1}{2}$ its gl., hairs of callus = $\frac{1}{4}$ gl. III.

Sikkim Himalaya; in woods, Yeumtong, alt. 12,000 ft., *J. D. H.*

Stem 12–18 in., geniculately ascending from a slender creeping base, weak. *Leaves* 6–8 in., narrowly linear, finely acuminate, smooth, flaccid; ligule short. *Panicle* 5–6 in.; branches few, lower 2–3 in. long, and pedicels smooth. *Spikelets*

pale green, shining; gl. I and II quite smooth on the sides and keels; III hyaline, lateral awns more than half as long as the gl., dorsal awn inserted $\frac{1}{4}$ above the base capillary, about twice the length of the gl.; rachilla short; callus hairs scanty short.

4. **D. compacta,** *Munro ex Duthie Grass. N.W. Ind.* 30 (*name only*); stem short, leaves very narrow, panicle open or spiciform, spikelets $\frac{1}{6}$ in., gl. I and II subequal oblong-lanceolate apiculate, III truncate tip erose, palea nearly as long as its gl., awn basal, hairs of callus short. ?Calamagrostis holciformis, *Jaub. & Spach. Ill. Pl. Orient.* iii. 61, t. 340.

WESTERN TIBET, *Jacquemont*; Nubra valley, alt. 14–16,000 ft., *Thomson*; N. of Kumaon, alt. 15,000 ft., *Strachey & Winterb.* (Deyeuxia, No. 1).

Stems 6–18 in., densely tufted, rather stout, sometimes slender. *Leaves* 1–3 in., flat or convolute; ligule short. *Panicle* 1–2 in., branches very short, scaberulous. *Spikelets* purplish; gl. I and II membranous, nearly smooth; III $\frac{1}{4}$–$\frac{1}{3}$ shorter than II, minutely scaberulous, strongly 4-nerved, callus hairs short lax.—In Jacquemont's and all other specimens in Herb. Kew, the panicle is oblong spiciform, with very short branches, and not as represented in the figure cited of *Calamagrostis holciformis* which is taken from a specimen collected by Jacquemont and in which the panicle is quite open. The glumes I and II are represented in the same plate as narrowly lanceolate tapering to a point, and scabrid, none of which characters agree with these specimens. Lastly, the date of collection is given as 1830, and that of the Kew specimen 1831. Nevertheless having regard to the great variability of these alpine grasses, I am disposed to think both referable to one species.

5. **D. nivicola,** *Hook. f.*; stem short, leaves obtuse or acute, panicle contracted spiciform, branches very short, spikelets $\frac{1}{4}$ in. very narrow, gls. I and II unequal lanceolate smooth, III truncate tip 4-mucronate, palea nearly = the gl., awn included? rachilla half as long as the gl. shortly plumose, callus shortly bearded. Deyeuxia n. 4, *Herb. Ind. Or. Hf. & T.*

SIKKIM HIMALAYA; Momay, alt. 15,000 ft., *J. D. H.*

Stem 5–7 in., densely tufted, erect or ascending, stout. *Leaves* as long as the stem or shorter, flat or subconvolute, $\frac{1}{10}$–$\frac{1}{6}$ in. broad; ligule short, truncate. *Panicle* 1–1$\frac{1}{2}$ in., strict, erect, green and purplish. *Spikelets* erect, appressed; gl. I about $\frac{1}{6}$ longer than II, both 1-nerved, acuminate; III about half as long as I, hardly scaberulous, nerves 4, strong; awn basal, not twice as long as the gl., erect.

** *Awn of gl. III inserted above the middle of the glume* (*awn* 0 *in* D. abnormis *and rachilla very minute or obsolete*).

6. **D. scabrescens,** *Munro ex Duthie in Atkins. Gaz. N.W. Ind.* 628; tall, stout, leaves long, panicle long contracted, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in., glumes all scaberulous, I and II subequal 1-nerved, III tip narrowed obtuse truncate crenulate or 2-fid, awn submedian, palea linear, callus shortly bearded. *Duthie Grass. N.W. Ind.* 31; *Clarke in Journ. Linn. Soc.* XXV. (1889) 89, t. 39. Calamagrostis scabrescens, *Griseb. in Goett. Nachr.* (1868) 79.

TEMPERATE HIMALAYA, alt. 10–13,000 ft., from Kashmir to Bhotan. MUNNEPORE, alt. 9900 ft., *Clarke.*

Stem 2–5 ft. *Leaves* 6–18 by $\frac{1}{8}$–$\frac{1}{3}$ in., flat or convolute, scaberulous; sheath smooth; ligule membranous, lacerate. *Panicle* 6–10 in., erect or inclined, dense-fid., branches scaberulous; pedicels long or short. *Spikelets* green or purplish; gl. I and II linear-lanceolate, acuminate, margins smooth or villously ciliate; III scarious, tip usually 2-fid, awn inserted rather above the middle about twice as long as the gl., slightly bent, rachilla = $\frac{1}{3}$–$\frac{1}{2}$ gl. III, sparingly or copiously bearded.

Grain narrowly oblong.—I do not find the awn to be twisted, as in the description cited, and it is inserted lower than in the figure in the Linnæan Journal.

Var. *humilis*, Griseb. l. c.; smaller, stems weaker, leaves $\frac{1}{10}$–$\frac{1}{6}$ in. broad, panicle small lax-fld., spikelets green, gl. III hardly scaberulous, palea shorter. Deyeuxia No. 2, *Herb. Ind. Or. Hf. & T.*—Sikkim Himalaya; Lachen Valley, alt. 11–12,000 ft., *J. D. H.*

7. **D. filiformis,** *Hook. f.*; stem very slender, leaves short, panicle short, spikelets $\frac{1}{8}$ in., gl. I and II subequal subscaberulous, II 3-nerved, III hyaline asperulous, tip truncate 4-cleft, awn capillary submedian exserted palea = $\frac{1}{2}$–$\frac{3}{4}$ its gl., hairs of rachilla about = the gl., hairs of callus short. Calamagrostis filiformis, *Griseb. in Goett. Nachr.* (1868) 79.

Sikkim Himalaya; Lachen Valley, alt. 10–12,000 ft., *J. D. H.*

Stem 12–18 in., terete, tufted. *Leaves* 2–4 in., narrow, nearly smooth; ligule membranous. *Panicle* 2–3 in. long and nearly as broad, pyramidal; branches few, very slender, nearly smooth. *Spikelets* shortly pedicelled, pale purplish; gl. I and II sometimes both 3-nerved; III strongly 4-nerved, irregularly 4-cleft at the apex, the lobes almost setaceous; awn inserted a little above the middle of the back.

8. **D. pulchella,** *Hook. f.*; stem short stout, panicle 1–2 in. oblong or ovate, spikelets $\frac{1}{6}$ in. crowded dark purple, gl. I and II scaberulous finely acuminate, III scaberulous irregularly 4-toothed or sub 4-aristate, awn supra-median to sub-apical included, palea $\frac{1}{3}$–$1\frac{1}{2}$ as long as its gl., rachilla densely penicillate hairs = gl. III, callus shortly bearded. Calamagrostis pulchella, *Griseb. in Goett. Nachr.* (1868) 78.

Alpine and subalpine Himalaya; from Kumaon and Garwhal, alt. 10–15,000 ft., to Sikkim, alt. 14–16,000 ft.—Distrib. Tibet. W. Szechuen, *Pratt.*

Stems densely tufted, strict, erect. *Leaves* 3–5 in., rarely more, $\frac{1}{10}$–$\frac{1}{8}$ in. broad, smooth or scaberulous, usually flat; ligule short, membranous. *Panicle* variable in size and form; branches minutely scabrid, sometimes elongate and spreading. *Spikelets* smaller than in *D. scabrescens* and not so strongly scaberulous, I and II rather unequal; III split at the tip into almost setiform lobes; insertion of awn most variable, but never quite terminal, capillary, as long as its gl. or shorter.—A very variable plant; the N.W. specimens have large looser more open panicles than the Sikkim. In one specimen from Garwhal, alt. 10–13,000 ft. (No. 143 and 245 Duthie) the panicle is very open) and I find occasionally a gl. terminating the rachilla.

9. **D. abnormis,** *Hook. f.*; tall, leaves narrow flat, panicle broad or narrow, branches in distant whorls of 3–6 divided and flg. toward the ends, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. long-pedicelled, gls. I and II subequal oblong-lanceolate acute, III rather shorter than I tip narrowly truncate crenulate, awn 0, palea = about $\frac{1}{2}$ its gl., rachilla very minute or obsolete, callus hairs = $\frac{1}{4}$–$\frac{1}{2}$ the gl. Agrostis abnormis, *Munro Cat. Pl. Griff. Helfer*, &c., 57, *ined.* Calamagrostis capillacea, *Clarke mss.*—Agrostis No. 11 & 12, *Herb. Ind. Or. Hf. & T.*

Sikkim Himalaya; Lachoong Valley, alt. 9000 ft., *J. D. H.* Khasia Hills, alt. 5–5500 ft., common, *Griffith*, &c.

Stem 6–18 in., densely tufted, erect strict and slender with a narrow panicle, or rambling with stout branching stems 3-4 ft. long and a very effuse panicle; upper internodes sometimes scaberulous. *Leaves* 6–8 by $\frac{1}{6}$–$\frac{1}{4}$ in., rather rigid, scaberulous, as are the sheaths; ligule short, rounded. *Panicle* 4–6 in., rachis very slender strict; branches and branchlets capillary, quite smooth. *Spikelets* pale brown; gl.

I and II 1-nerved; III glabrous, nerves faint; hairs of callus longest under the palea.—Resembles *Agrostis alba*, from which the long callus hairs at once distinguish it.

B. Rachilla minute, glabrous; callus hairs very short.

10. **D. Treutleri,** *Stapf in Hook. Ic. Plant.* t. 2396; tall, slender, panicle elongate lax-fld., spikelets $\frac{1}{12}$–$\frac{1}{10}$ in., gl. I and II very unequal lanceolate subacute scaberulous, III longer than II coriaceous obtuse scaberulous, palea as long as the gl., rachilla very small styliform, callus minutely hairy. Milium Treutleri, *O. Kuntze Rev. Gen. Plant.* 780 (*partim*).

SIKKIM HIMALAYA, alt. 7–12,000 ft., in woods, *J. D. H., Treutler, Clarke.*

Stem 2–4 ft., leafy nearly to the top. *Leaves* 8–10 by $\frac{1}{4}$–$\frac{1}{2}$ in., linear-lanceolate, acuminate, flaccid, scaberulous beneath; ligule oblong. *Panicle* ovate, flaccid, at length rigid, scaberulous; branches in distant whorls. *Spikelets* narrowly ovoid, pale; gl. I ovate-lanceolate, acute, 1-nerved; II longer, subacute, 1-nerved; III longer than II, laterally compressed, keeled; palea about as long as the gl. *Grain* oblong, laterally compressed, tightly wrapped in the gl. and palea.—A very anomalous species.

Tribe VII. AVENEÆ. (See p. 6.)

76. ERIACHNE, *Br.*

Rigid, densely tufted grasses. *Leaves* filiform, convolute. *Spikelets* few, 2-fld. (both fl. perfect), not jointed on their long pedicels; rachilla jointed at the base, not produced beyond gl. IV. *Glumes* 4, I and II empty, subequal, persistent, keeled, many-nerved; III and IV subequal, narrow, at length rigid, awned or not; palea rigidly coriaceous, 2-cuspidate or 2-aristate, nerves obscure. *Lodicules* 2, oblong, truncate. *Stamens* 2–3. *Styles* free, stigmas plumose. *Grain* free within the rigid gl. and palea.—Species about 22 Australian, and 2 Asiatic.

1. **E. triseta,** *Nees ex Steud. Syn. Gram.* 237; gl. I and II linear-lanceolate, III and IV long-awned, palea long-awned. *Trim. Cat. Ceyl. Pl.* 108; *Steud. Syn. Gram.* 237. Megalachne zeylanica, *Thwaites Enum. Pl. Zeyl.* 372, 444.

TENASSERIM; Mergui, *Griffith, Helfer.* CEYLON; Colombo, *Thwaites.*

Stems 1½–2 ft., slender, erect, branched below. *Leaves* 3-nerved; ligule very short, ciliate. *Panicle* 2–4 in. *Spikelets* with the awns ½–⅔ in. long, purple; gl. I and II subaristate, glabrous; III and IV narrow, silky; callus long.

2. **E. pallescens,** *Br. Prodr.* 184; gl. I and II ovate acuminate, III, IV, and palea bicuspidate. *Kunth Enum. Pl.* i. 310; *Steud. Syn. Gram.* 237. *Benth. Fl. Austral.* vii. 630. E. chinensis, *Hance in Ann. Sc. Nat. Ser.* IV. xv. (1861) 228, *in Journ. Linn. Soc.* xiii. (1873) 136. E. Hookeri, *Munro in Journ. Linn. Soc.* vi. (1862) 42, *name.* Aira effusa, *Spreng. Syst.* i. 278.

CHITTAGONG, *J. D. H. & T. T.* PAHANG, *Ridley.* NICOBAR ISLDS., *Kurz.*—DISTRIB. Borneo, Tonkin, China, Australia.

Stem 1–2 ft. *Leaves* glabrous or slightly hairy. *Panicle* very lax. *Spikelets* with the awns ¼ in.; gl. I and II slightly hairy; III and IV narrow and palea villously hirsute, awns of III and IV about = the gl., of palea very short.—Bentham describes the palea as entire, but in the Indian specimens they terminate in two short rigid spines.

77. **ZENKERIA,** *Trin.*

Tall, perennial, long-leaved grasses. *Spikelets* small, panicled, 2-fld. (both fl. perfect), not jointed on their pedicels; rachilla jointed at the hairy base, not produced beyond gl. IV. *Glumes* 4, I and II empty, subequal or unequal, 1-nerved, keeled, acute, persistent; III and IV equal, obtuse or acuminate, many-nerved; palea as long as its gl., broad, keels strongly ciliate or hirsute. *Lodicules* 2, ovate, denticulate. *Stamens* 3. *Styles* short, distinct. *Grain* unknown.—Species the following.

1. **Z. elegans,** *Trin. in Linnæa,* xi. (1837) 150, t. 3; leaves long narrow, panicle thyrsiform, branches erect, gl. I and II unequal, III and IV acuminate much longer than II. *Trim. Cat. Ceyl. Pl.* 108. Amphidonax Heynii, *Nees in Wight Cat.* n. 1747; *Steud. Syn. Gram.* 97; *Thwaites Enum. Pl. Zeyl.* 370. A. tenella, *Wight & Arn. ex Steud. l. c.*—Pappophorum? *Wall. Cat.* n. 8903.

Southern Deccan Peninsula, *Heyne,* &c. Burma, *Kurz.* Ceylon, *Thwaites,* &c.

Stem 2–3 ft., as thick as a crow-quill, rigid, base woody. *Leaves* as long as the stem or longer, strict, coriaceous, convolute, rarely flat, glabrous or sparsely hairy; sheaths coriaceous; ligule rounded. *Panicle* 6–8 in.; rachis flexuous; branches filiform, smooth. *Spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in., pedicelled, white; gl. I and II ovate, hyaline, 1-nerved; I shortest, midrib very strong, excurrent; III and IV lanceolate, sparsely villous, 7–9-nerved; IV longest and most acuminate; callus bearded with long straight hairs; palea as broad as the gls., hirsute. *Anthers* long, narrow.

2. **Z. obtusiflora,** *Benth. in Journ. Linn. Soc.* xix. (1881) 93; leaves broadly linear-lanceolate narrowed at both ends, panicle pyramidal, branches widely spreading, gl. I and II unequal or subequal, III and IV obtuse not longer than II. *Trim. Cat. Ceyl. Pl.* 108. Amphidonax obtusiflora, *Thwaites Enum. Pl. Zeyl.* 370.

Ceylon; at Ratnapoora, *Thwaites.*

Stems 3–5 ft., glabrous. *Leaves* 2 ft. by $\frac{3}{4}$–1 in., acuminate, pungent, glabrous, coriaceous; ligule very short, densely hairy. *Panicle* 6–8 in.; branches capillary, solitary or 2-nate; pedicels longer than the spikelets, with a glandular callus at the base. *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in., as broad as long; gl. I and II ovate, apiculate by the strong excurrent nerve, glabrous; III and IV rather longer, sides and callus villous; palea as in *Z. elegans.*

78. **COELACHNE,** *Br.*

A small leafy very variable marsh grass. *Leaves* short, flat or convolute. *Spikelets* 2-fld. (both fl. perfect or upper imperfect) in open or contracted or spiciform panicles, not jointed on the pedicels, not awned; rachilla jointed at the base, produced between gl. III and IV but not beyond IV. *Glumes* I and II broad, concave, obtuse, persistent, empty, I the largest; III much longer, subsessile, coriaceous, glabrous, except the shortly bearded callus; palea as long, coriaceous; IV much smaller and palea more or less hairy. *Lodicules* 0? *Stamens* 3; anthers long, narrow. *Ovary* ovoid, stigmas free. *Grain* free within the gl. and palea.

C. pulchella, *Br. Prodr.* 187.

Nepal, *Wallich,* Khasia and Munnepore Hills, alt. 4–6000 ft., Burma, Central and Southern India, and Ceylon.—Distrib. Trop. Asia, Australia, and Madagascar.

Stem 6–18 in., flaccid, decumbent or ascending, slender or rather stout, leafy up to the panicle. *Leaves* uniform throughout the stem, ½–1 in., lanceolate, subulate, acuminate, distant or subequitantly sheathing, ecostate, minutely scaberulous above, nerves striate; ligule a few hairs. *Panicle* very various. *Spikelets* $\frac{1}{20}$–$\frac{1}{10}$ in., sessile or pedicelled, globose or ovoid; gl. I and II suborbicular or hemispheric, many-nerved, membranous or herbaceous; III hermaphrodite, coriaceous, dorsally rounded, nerves 0 or very obscure; palea coriaceous, margins incurved; IV much the smallest, often imperfect, neuter or fem.—After a long study of a multitude of specimens from all the countries mentioned above, I conclude that there is but one known species of this genus. If there are two, the second is one to include vars. *gracillima* and *perpusilla*, in which case the latter name would be very inappropriate for both.

Var. *pulchella* proper; stems filiform decumbent and ascending, leaves lanceolate flat, panicle with distant spreading filiform branches, spikelets $\frac{1}{20}$–$\frac{1}{18}$ in. subglobose, gl. I and II hemispheric, III broadly ovoid, IV faintly hairy or glabrous. C. pulchella, *Br. l. c.*; *Endl. Iconogr.* t. 2; *Kunth Revis. Gram.* ii. t. 143, *Enum. Pl.* i. 371; *Steud. Syn. Gram.* 284; *Benth. Fl. Austral.* vi. 626. Gramin, *Wall. Cat.* n. 8909.—Burma; source of the Chappedong River, *Wallich*. Australia.

Var. *brachiata*, Munro in Herb. Kew; stem stout or slender suberect or ascending, panicle 2–4 in. long, branches shorter than in *pulchella* proper, spikelets $\frac{1}{20}$–$\frac{1}{15}$ in. like those of *pulchella* proper but sessile. C. brachiata, *Munro ex Benth. Fl. Austral.* vii. 626 (*partim*).—Tenasserim, *Griffith* (*Kew Distrib.* 6675) *Helfer*.

Var. *simpliciuscula*; stem suberect or creeping and rooting rather stout, leaves flat, panicle elongate narrow, branches short stiff, spikelets $\frac{1}{15}$ in. ovoid sessile crowded on the branches or in fascicles on the main rachis, gl. I and II unequal, III ovate-lanceolate. C. simpliciuscula, *Munro ex Benth. in Journ. Linn. Soc.* xix. (1881) 93, *Fl. Austral.* vii. 626. C. infirma, *Buese Pl. Jungh.* i. 350; *Miq. Fl. Ind. Bat.* iii. 399. C. pulchella, *Thw. Enum.* 273; *Benth. Fl. Hongk.* 430. C. brachiata, *Trim. Cat. Ceyl. Pl.* 108. C. madagascariensis, *Baker, in Journ. Linn. Soc.* xxv. (1890) 348. Isachne brachyglumis, *Hochst. in Hohen. Pl. Nilgh.* n. 1283 (*name*). Panicum simpliciusculum, *Wight & Arn. ex Steud. Syn. Gram.* 96.—Khasia and Naga Hills, alt. 4–5000 ft. *J. D. H. & T. T.*, *Clarke*. Nilghiri Hills, *Wight*, &c. Ceylon, *Walker*, *Thwaites* (CP. 884).—Java, Tonkin, China, Madagascar.—Intermediate between *brachiata* and *spicata*.

Var. *spicata*; stem short stout suberect, leaves flat, spikelets $\frac{1}{20}$–$\frac{1}{16}$ in. ovoid in dense spiciform panicles subsessile, gl. I and II orbicular subequal membranous, III broadly ovate.—Nepal, *Wallich* (Cat. n. 8908). Chota Nagpore, *Clarke*. S. India, *Wight* (*Herb.* n. 3376).—China.

Var. *gracillima*, stems 6–12 in. capillary or filiform, leaves flat, panicle very slender, branches short spreading, spikelets few $\frac{1}{16}$–$\frac{1}{10}$ in. pedicelled, gl. I and II very unequal, III and IV lanceolate. C. perpusilla, *Thw. Enum.* 373 (*in part*).—Nilghiri Hills, *Schmid*. Ceylon, Adam's Peak and Newera Elia, in swamps, *Thwaites* (C.P. 130).

Var. *perpusilla*, stems capillary densely tufted. leaves filiform, panicles as in *gracillima* but with fewer branches and spikelets. C. perpusilla, *Thw. l. c. in part* (C.P. 450). Trim. l. c. (*in part*). Isachne perpusilla, *Wight & Arn. ex Wight Cat.* n. 2043.—Ceylon, *Walker*, Adam's Peak, *Thwaites*.

Var. *Gardneri*; stem 12–18 in. stout flexuous, clothed throughout with subulate-lanceolate erect sheathing leaves, panicle stiff with few short spreading branches, spikelets $\frac{1}{12}$–$\frac{1}{10}$ in. sessile, gl. I and II subequal, III ovate.—Ceylon, *Gardner* (n. 1018, 1019).

79. **TRISTACHYA**, *Nees.*

Perennial grasses. *Leaves* various. *Spikelets* 2-fld. (lower fl. male upper fem. or perfect), panicled, not jointed on their pedicels; rachilla villous, produced between gl. II and III but not beyond IV, jointed at the base. *Glumes* 4; I and II unequal, not awned, persistent, empty, lanceolate,

acuminate, glabrous; III lanceolate, acuminate, membranous, awn 0; IV deeply 2-fid with a long twisted awn in the sinus (copiously bearded above the middle in the Indian sp.); palea narrow, acute. *Lodicules* minute, cuneate, fleshy. *Anthers* long. *Styles* long, slender. *Grain* narrow, free.—Species 8, chiefly tropical.

T. barbata, *Nees ex Steud. Syn. Gram.* 238; *Boiss. Fl. Orient.* v. 552; *Duthie Grass. N.W. Ind.* 32. T. Stocksii, *Boiss. l. c.*; *Munro in Aitchis. Cat. Panjab. Pl.* 168; *Duthie Fodd. Grass. N. Ind.* 51. Loudetia barbata, *A. Braun in Flora*, xxiv. (1841) ii. 714. Sorghum barbatum, *Hochst. et Steud. Pl. Arab. Exsicc.* n. 788.

SCIND; *Stocks.*—DISTRIB. Arabia, Nubia.

Stem 6–18 in. branched and woody below, geniculately ascending, base clothed with tomentose sheaths, slender and wiry above; nodes bearded. *Leaves* 1–3 in., lanceolate from a rounded base, finely acuminate, pungent, rigid, glaucous, many-nerved, margin thickened subserrulate; sheaths smooth; ligule 0. *Panicle* sparingly branched, 1–2 in. long and broad; branches solitary and 2-nate, capillary, flexuous, subscaberulous, branchlets 1–3-fld. *Spikelets* ½ in., pale yellowish; gl. I and II 3-nerved, II ¼–⅓ longer than I; III much longer than I, interruptedly 7-nerved, and its callus glabrous; IV with a very short broad lamina, margins involute, lateral lobes lanceolate, aristate, 3-nerved, rather longer than the hairs; median awn about twice as long as the gl.—I find no character for *T. Stocksii.*

80. **AIRA**, *Linn.*

Annual or perennial grasses. *Leaves* narrow. *Spikelets* 2-fld. (both fl. perfect) panicled, branches capillary; rachilla jointed at the base, not produced beyond gl. IV. *Glumes* 4, hyaline; I and II subequal, 3-nerved, acute, empty, persistent; III and IV smaller, often 2-toothed; awn dorsal, capillary, usually twisted below; callus naked; palea hyaline, 2-nerved. *Lodicules* 2. *Anthers* small. *Grain* minute, free or adhering to the hyaline gl.—Species 4 or 5, Europe and temp. Asia.

A. caryophyllea, *Linn. Sp. Pl.* 66; annual, very slender, leaves setaceous, ligule lanceolate, panicle broad erect capillary trichotomously branched, spikelets long-pedicelled. *Kunth Enum. Pl.* i. 289, *Suppl.* 241, t. 18, f. 2; *Fl. Dan.* t. 382; *Lamk. Encycl.* t. 44; *Host Gram. Austr.* ii. 33, t. 44; *Svensk. Bot.* t. 508; *Reichb. Ic. Fl. Germ.* t. 94; *Engl. Bot.* t. 812; *Knapp Gram. Britt.* t. 35; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 44; *Steud. Syn. Gram.* 221; *Ledeb. Fl. Ross.* iv. 424; *Boiss. Fl. Orient.* v. 529; *Duthie Grass. N.W. Ind.* 31. A. canescens, *Host l. c.* iv. 21, t. 36. A. Cupaniana, *Guss Fl. Sic. Syn.* i. 145. A. curta, patulipes & plesiantha, *Jord. ex Bor. Fl. Centr. Fr. Ed.* III. ii. 701. A. divaricata, *Pourr. in Mem. Acad. Toul.* iii. (1788) 307. A. multiculmis, (multicaulis, *Kunth*), *Dumort. Agrost. Tent.* 121, t. 7, f. 28. A. purpureo-argentea, *Gilib. Exercit.* ii. 526. A. rigida, *Dulac Fl. Haute-Pyren.* 82. A. Todari, *Tenore ex Tod. Ind. Sem. Hort. Panorm.* 1859; *Linnæa*, xxx. (1859) 783. A. triaristata, *Clarke Trav.* ii. 452. Avena caryophyllea, *Weber in Wigg. Prim. Fl. Hols.* 10. Fussia caryophylla, *Schur Enum. Pl. Transs.* 754.

N.W. HIMALAYA; Kashmir, *Vicary, Stewart*, Kohat, and Lahul, *Hay*, &c. WESTERN TIBET, alt. 12,000 ft., *Stolizka.*—DISTRIB. N. Africa, temp. Asia (introd. elsewhere).

Stems 2–10 in., tufted, filiform, scabrid above. *Leaves* obtuse and sheaths

scabrid, ligule long. *Panicle* 1–2 in. long and broad. *Spikelets* $\frac{1}{12}$–$\frac{1}{10}$ in., ovoid, shining, gl. I and II ovate, exceeding II and III, keels scabrid; tips of flg. gls. 2-setose; awn twice as long as the gls., bent.

81. **DESCHAMPSIA,** *Beauv.*

Perennial grasses. *Leaves* flat or convolute. *Spikelets* 2- (rarely 3-) fld. (both fl. perfect) panicled, not jointed on their pedicels; rachilla jointed at the base, produced beyond gl. IV as a naked or penicillate stipes rarely bearing a male fl. Glumes 4; I and II empty, subequal, or II largest, persistent, keeled, acute, membranous, shining; III and IV subhyaline, tip toothed or lobed; awn dorsal, slender, straight or twisted; palea narrow, 2-nerved. *Lodicules* ovate, fleshy. *Stamens* 3. *Styles* distinct. *Grain* oblong, free within the gl.—Species about 20, of temp. regions.

1. **D. cæspitosa,** *Beauv. Agrost.* 91, t. 18, f. 3; stem short or tall, panicle effuse or contracted, spikelets variable in size, gl. I and II ovate-lanceolate acute subequal or II rather longer, IV hardly exceeding II, awn about equalling the gl., straight not twisted. *Kunth Enum. Pl.* i. 286, *Suppl.* 241; *Ledeb. Fl. Ross.* iv. 421; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 43; *Boiss. Fl. Orient.* v. 531; *Benth. Fl. Austral.* vii. 587; *Hook. f. Fl. Nov. Zel.* i. 301; *Duthie Grass. N.W. Ind.* 31. Aira cæspitosa, *Linn. Sp. Pl.* 64; *Fl. Dan.* ii. t. 240; *Engl. Bot.* t. 1453; *Knapp Gram. Britt.* t. 33; *Trin. Sp. Gram. Ic.* t. 253, 256; *Reichb. Ic. Fl. Germ.* t. 96. A. Kingii, *Hook. f. Fl. Antarct.* 376, t. 135. A. major, *Syme Engl. Bot. Ed.* III. xi. 63. A. micans, *Jacquem. mss.* Triodia splendida, *Steud. Syn. Gram.* 249.—Deschampsia, *Wall. Cat.* n. 3802; Gramin. *Wall. l. c.* n. 8911.

Temperate and Alpine Himalaya and Western Tibet, in swamps from Kashmir to Bhotan, alt. 10–16,500 ft.—Distrib. N. and S. temp. and cold regions.

Stem 6 in. to nearly 3 feet high, stout or slender, smooth, shining, leafy upwards or in small states at the base chiefly. *Leaves* short or long, flat, rather softly coriaceous, quite smooth; sheaths smooth, upper very long; ligule obtuse. *Panicle* 4–8 in., short dense-fld. and erect, or lax-fld. effuse and inclined, sparingly branched; branches and pedicels capillary, smooth or minutely sparsely scaberulous. *Spikelets* $\frac{1}{7}$–$\frac{1}{6}$ in., white and silvery or fulvous purplish; rachilla slender, hairy; gl. I and II concave, subacute, nerveless, or II which is broadest sub-3-nerved; III and IV truncate, erose, crenate or irregularly toothed, callus silkily hairy; awn dorsal, sub-basal.—I have not attempted to give all the synonymy of this almost cosmopolitan (in temperate regions) and very variable plant which, I think, includes fully a dozen supposed species of the N. temperate and Arctic zones. Wallich's n. 8911 "Aira coerulea, *Hb. Madr.*" was long a puzzle to me. It is accompanied with the ticket "Aira coerulea, Blå tå tel," which latter word Dr. Stapf recognized as the Swedish for *Molinia coerulea.* No doubt the specimen, which is of *Deschampsia cæspitosa*, is a Swedish one, and was introduced by accident into the Madras Herbarium.

Var. *colorata*, Griseb. Spicil. Fl. Rumel. ii. 457; stem short strict 4–6 in., leaves short basal, panicle small broadly ovate dense-fld., pedicels and branchlets very short, spikelets dark bronzy-yellow, sometimes 3-fld., *Boiss. l. c.* D. Bieberstenianus, *Sch. f. Mant.* ii. 380. D. brevifolia, *Br. in Parry Voy. App.* 191. Aira brevifolia, *Bieb. Fl. Taur. Cauc.* iii. 63. A. triflora, *Trin. in Flora*, i. (1836) 433. A. Wilhelmsii, *Steud. Syn. Gram.* 219.—Western Tibet; Balch Pass, alt. 16,500 ft., *Strach. & Winterb.* Sikkim, alt. 14–16,000 ft., *J. D. H.*

2. **D. kœlerioides,** *Regel in Bull. Soc. Nat. Mosc.* xli. (1868) 299; stem short, leaves basal linear erect, panicle short ovoid or subspiciform,

spikelets very shortly pedicelled imbricating brownish-yellow, gls. III and IV broad more or less 2-lobed lobes irregularly toothed.

KASHMIR and BALTISTAN, DRAS, and ISKARDO, alt. 10–14,500 ft., *Clarke Duthie.*—DISTRIB. Turkestan.

Stem 6–18 in., leafy below, rather stout, strict, erect. *Leaves* 2–5 by $\frac{1}{10}$–$\frac{1}{8}$ in., linear, acute, flat, nearly smooth; ligule oblong. *Panicle* 1–1½ in., erect. *Spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in.; gl. I shorter than II, sometimes 2-lobed nearly $\frac{1}{3}$ way down with erose lobes, at others hardly lobed but unequally rather deeply toothed.—Perhaps only a form of *D. cæspitosa*, the flg. glumes of which vary much in breadth and toothing. Regel describes the leaves of *kæleriodes* as narrow setaceous and scabrid above, which is totally at variance with his specimens, which are even broader than those of the Indian plant.

81*. HOLCUS, *Linn.*

Annual or perennial tomentose grasses. *Leaves* usually flat. *Spikelets* panicled, laterally compressed, oblong, 2-fld. (both fl. bisexual, or upper male or neuter), not jointed on their pedicels; rachilla articulate at the base produced into a short stipes beyond gl. IV. *Glumes* 4; I and II empty, persistent, obtuse or acute, keeled, I 1-nerved; II 3-nerved; III and IV shorter than I and II, membranous; III not awned, at length hardened; IV with a slender dorsal awn; palea narrow, 2-keeled. *Lodicules* 2, cuneiform. *Stamens* 3. *Styles* very short, distinct. *Grain* oblong, free within the hardened gl.—Species about 8, European and African.

H. LANATUS, *Linn. Sp. Pl.* 1047; perennial, softly tomentose, panicle spreading pale green, spikelets $\frac{1}{6}$ in., awn of gl. IV hardly exserted. *Fl. Dan.* t. 1181; *Host Gram. Austr.* i. p. 275, t. 2; *Engl. Bot.* t. 1169; *Knapp Gram. Britt.* t. 17; *Kunth Enum. Pl.* i. 34, *Suppl.* 24, t. 9, f. 2; *Ledeb. Fl. Ross.* iv. 410; *Reichb. Ic. Fl. Germ.* t. 105; *Boiss. Fl. Orient.* v. 532.

SIKKIM HIMALAYA; Darjeeling, alt. 7000 ft., *Clarke*, apparently naturalized.—DISTRIB. Europe, temp. Asia.

Stems 1–3 ft., densely tufted, roots fibrous, nodes villous. *Leaves* 6–10 in.; upper sheaths inflated; ligule short, oblong. *Panicle* 2–5 in., branches 2–3-nate. *Spikelets* pale green or reddish; gl. I and II acute or apiculate, strongly-nerved; II often retuse and mucronulate; III smooth and shining in fruit.—*H. mollis*, L., an almost equally common European grass, may be expected to be introduced into the hills of India; it closely resembles *H. lanatus*, but has a creeping rootstock and the awn of gl. IV is longer and exserted.

82. **AVENA,** *Linn.*

(Including TRISETUM, *Beauv.*)

Annual or perennial grasses. *Leaves* usually flat. *Spikelets* 2- or more-fld., in effuse contracted or spiciform panicles, not jointed on their pedicels; rachilla jointed at the base and sometimes between the flg. glumes. *Glumes* dorsally rounded, I and II empty, subequal or unequal, thin, persistent, few- or many-nerved; fl. gls. ovate or lanceolate, entire 2-toothed or -cleft, lobes awned or not, 3–7-nerved, lateral nerves sometimes obsolete; awn dorsal below the cleft, usually long and geniculate or reflexed with a twisted base, rarely straight; palea narrow, keels scabrid or ciliate. *Lodicules* usually 2-fid. *Ovary* glabrous or top villous; styles short, free. *Grain* various, free or (in some sp. with villous top) adherent to the palea.—Species many, chiefly N. temperate.

Having regard to the Indian species of *Avena* and *Trisetum*, I find it impossible to separate them by characters of the fl. gls., there being all transitions in *A. aspera* from the entire gl. of *Avena* to the 2-aristate lateral lobes of *Trisetum*. There are two distinct types of ovary in both genera, the perfectly glabrous, and that with a broad hirsute or villous crown, characters which may suggest a better means of breaking up *Avena*. The following arrangement is provisional only. It is difficult to diagnose *Avena* from *Bromus* & *Koeleria* (*q.v.*).

Sect. I. EUAVENA. Annual. *Spikelets* pendulous; gl. I and II 5–7-nerved, lobes of fl. gls. awned or not; awn cylindric, column 2-grooved, conoidally twisted. *Ovary* with a villous top.—The determinations of the species of this section are by Dr. Stapf.

* Flowering glumes glabrous or hairy at the base only, rachilla tenacious or tardily disarticulating at the base.

A. SATIVA, *Linn. Sp. Pl.* 79.

Cult. in NORTHERN INDIA, from Bengal to the Indus; and in the HIMALAYA up to 12,000 ft.

There are few specimens of the common oat in Indian collections. These represent two varieties.

Var. *sericea*; branches of panicle spreading equally all round, spikelets 2-fld., both fl. perfect, gls. III and IV silkily hairy at the base, rachilla silkily villous.—Bhotan, *Griffith*. Sikkim Himalaya, cult. at Yeumtong, alt. 12,000 ft., *J. D. H.* Beluchistan and Affghanistan; wild in cult. fields in the Kurrum Valley, *Aitchison* (n. 24).

Var. *orientalis*; branches of panicle more or less secund, spikelets 2–3-fld. the lower only perfect, gl. III with stiff hairs at the base, IV and rachilla glabrous. A. orientalis, *Schreb. Spicil. Fl. Lips.* 52; *Host Gram. Austr.* iii. 31, t. 44; *Kunth Enum. Pl.* i. 302, *Suppl.* 255; *Boiss. Fl. Orient.* v. 541. A. sterilis, *Royle Illustr. Himal. Bot.* 417.—N.W. India, *Royle*. Soane Valley, *J. D. H.* Murshidabad, *Clarke*.

** Flowering glumes hairy to and beyond the middle; rachilla freely disarticulating at the base, more tardily above it; gl. III and IV firm, shortly 2-fid., scaberulous.

1. **A. fatua**, *Linn. Sp. Pl.* 80; panicle branches equally spreading all round, gls. I and II subequal 9-nerved, III and IV firm scaberulous shortly 2-fid. clothed below with long fulvous hairs. *Host Gram. Austr.* ii. 42, t. 58; *Fl. Dan.* t. 1629; *Engl. Bot.* t. 2221; *Knapp Gram. Britt.* t. 93; *Kunth Enum. Pl.* i. 302, *Suppl.* 256; *Reichb. Ic. Fl. Germ* t. 103; *Steud. Syn. Gram.* 230; *Ledeb. Fl. Ross.* iv. 412; *Boiss. Fl. Orient.* v. 543; *Royle Ill. Himal. Bot.* 416; *Duthie Grass. N.W. Ind.* 31, *Fodd. Grass. N. Ind.* 51. A. byzantina, *C. Koch in Linnæa*, xxi. (1848) 392. A. sterilis, *Del. ex Boiss. l. c.*; *Duthie l. c.* 32 (*non Linn.*)? A. pilosa, *M.B. Griseb. in Goett. Nachr.* (1868) 78.

The PANJAB, N.W. HIMALAYA, and WESTERN TIBET, in cult. fields, ascending to 9000 ft. SIKKIM HIMALAYA, alt. 9000 ft., *Gammie*.—DISTRIB. Temp. Europe, N. Africa, and N. Asia.

Stem 1–3 ft., stout, nodes hairy. *Leaves* flat, scaberulous; sheaths smooth; ligule short, torn. *Panicle* 6–10 in.; branches and pedicels scabrid. *Spikelets* about 1 in.; rachilla hairy. *Callus* of gl. III short, obtuse, setulose; awn stout, longer than the gls.

2. **A. barbata**, *Brot. Fl. Lusitan.* i. 108; softly tomentose, panicle

subsecund, spikelets 2-fld., gls. I and II 9-nerved, III and IV thin not scaberulous 2-fid with awned lobes densely hirsute below the middle. *Ledeb. Fl. Ross.* iv. 413; *Boiss. Fl. Orient.* v. 543; *Griseb. in Goett. Nachr.* (1868) 78. A. athenanthera, *Presl Gram. & Cyp. Sic.* 30. A. hirsuta, *Roth. Catalect. Bot.* iii. 19; *Kunth Enum. Pl.* i. 302; *Webb. Phyt. Canar.* iii. 400, t. 247; *Steud. Syn. Gram.* 230; *Royle Ill. Himal. Pl.* 417. A. hirtula, *Lag. Gen. & Sp. Nov.* 50; *Kunth l. c. & Suppl.* 256.

WESTERN HIMALAYA; Kumaon, *Thomson.*—DISTRIB. Mediterranean region, W. and N. Asia.

Habit of *A. fatua*, from which its hairy leaves, &c. distinguish it.—These Avenaceous weeds of cultivation have not been much collected in India, where the above and others no doubt abound.

Sect. II. Annual, dwarf. *Spikelets* erect, gl. I 1-nerved, II 3-nerved, top of fl. gl. 2-aristate. *Ovary* glabrous, narrow.

3. **A. Cavanillesii,** *Koch Syn. Fl. Germ. Ed.* I. i. 797; leaves flat or convolute, panicle spiciform, spikelets 2-fld. A. Loefflingiana, *Cav. Ic.* i. t. 45, f. 1; *Gaud. Agrost. Helvet.* i. 327; *Balb. Misc. Bot.* i. 12 (*non Linn.*). A. valesiaca, *Nym. Syll. Fl. Europ.* 414. Trisetum Cavanillesii, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 63 (*excl. Syn. Cav.*); *Kunth Enum. Pl.* i. 297; *Steud. Syn. Gram.* 225. T. Gaudinianum, *Boiss. Voy. Esp.* 653, *Fl. Orient.* v. 535; *Parlat. Fl. Ital.* i. 259. T. Loefflingianum, *Beauv. ex Duthie Grass. N.W. Ind.* 31. T. valesiacum, *Boiss. ex Nym. Conspect.* 814.

BRITISH BELUCHISTAN; at Killa Abdulla, *Duthie.* PESHAWUR, *Stewart* (*ex Duthie*).—DISTRIB. Westward to Spain.

Stems 4–6 in., densely tufted. *Leaves* ½–1 in., linear, obtuse, sparsely hairy, rather thick; ligule oblong, hyaline. *Panicle* 1–2 in., oblong; branches and pedicels very short, smooth. *Spikelets* ⅙ in., shining, green with purplish awns, 2-fld. and with a third imperfect; rachilla densely villous, hairs longer than the gl.; gl. I and II very unequal, keels smooth; I lanceolate; II oblong, acute; III much shorter than II, lanceolate, hyaline above and 2-nerved, the nerves ending in lateral awns as long as the gl.; callus bearded; dorsal awn nearly twice as long as the gl.; palea narrowly linear, nerveless.

Sect. III. Perennial. *Spikelets* erect. *Fl. gls.* 5–9-nerved. *Ovary* hirsute.

4. **A. pratensis,** *Linn. Sp. Pl.* 80; panicle contracted, spikelets 5–7-fld., gl. I and II 3-nerved, flg. gls. entire rounded notched or erose at the tip. *Fl. Dan.* t. 1083; *Host Fl. Austr.* ii. 38, t. 51; *Engl. Bot.* t. 1204; *Knapp Gram. Britt.* t. 91; *Reichb. Ic. Fl. Germ.* i. t. 99; *Kunth Enum. Pl.* i. 300, *Suppl.* 254; *Steud. Syn. Gram.* 231; *Ledeb. Fl. Ross.* iv. 414; *Boiss. Fl. Orient.* v. 546; *Duthie Grass. N.W. Ind.* 31. A. alpina, *Sm. in Trans. Linn. Soc.* x. (1811) 335; *Kunth l. c.* 301; *Griseb. in Goett. Nachr.* (1868) 78. A. argæa, *Boiss. l. c.* A. bromoides, *Mert. & Koch in Roehl. Fl. Deutschl. Ed.* III. i. 570. A. secunda, *Jacquem. mss.* (*non Salisb.*). Heuffelia præusta & pratensis, *Schur Enum. Pl. Transs.* 780. H. australis, *Fourn. in Ann. Soc. Linn. Lyon, N.S.* xvii. (1869) 183.

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 9–15,000 ft.—DISTRIB. Europe, Asia Minor.

Stems 10–18 in., densely tufted, rather stout, strict, leafy below. *Leaves* 6–10 by ⅛–⅙ in., erect, coriaceous, scaberulous above, margins thickened; sheath nearly smooth; ligule oblong, lacerate. *Panicle* 3–4 in., erect or inclined; branches short, erect, and pedicels scaberulous. *Spikelets* ½–¾ in., narrow, glistening, green or

coppery-brown; rachilla penicillate; gl. I and II scarious, nerves scaberulous; I linear-oblong; II oblong-lanceolate; fl. gls. oblong, scarious above the middle, strongly 7–9-nerved, tip and margins broadly hyaline, margins and nerves scaberulous; awn median-dorsal, twice as long as the gl., bent just above the top of the gl.; keels of palea smooth.—Hackel (in litt.) refers the Kashmir plant to *A. argaea*, Boiss., which the latter author distinguishes from *A. pratensis* by the short leaves, very short branches of the short few-fld. panicle, and golden-brown spikelets, characters all of which may be traced in Kashmir and European *A. pratensis*.

5. **A. aspera,** *Munro ex Thw. Enum. Pl. Zeyl.* 372; tall, slender, panicle elongate contracted flexuous inclined or nodding, branches suberect naked below, spikelets 3–4-fld. scattered, gl. I and II very unequal scarious, I 1–3-nerved, II 5-nerved, fl. gls. coriaceous smooth or scabrid 5–7- (rarely 3-) nerved tip entire erose 2-fid or 2-aristate, keels of palea closely pectinately ciliate. *Trimen Cat. Ceyl. Pl.* 109; *Griseb. in Goett. Nachr.* (1868) 78.

Sikkim Himalaya, alt. 9–10,000 ft., *J. D. H.*, *Clarke*. Khasia Hills, alt. 5–6000 ft., *Griffith*, &c. Nilghiri Hills, *Schmid*, *Maxwell*. Ceylon, alt. 6000 ft., *Thwaites*.

Stem 2–5 ft., slender or rather stout, erect or inclined, glabrous, or nodes slightly pubescent. *Leaves* 6–12 in. or more, flat or convolute, rarely ½ in. diam.; sheaths smooth, glabrous or pubescent; ligule short, truncate, membranous. *Panicle* 8–16 in., usually nodding, rachis and branches smooth or faintly scabrid; lower branches 1–6 in., solitary geminate or fascicled. *Spikelets* ⅓-⅔ in. long, glistening, green, oblong; rachilla penicillate, slender; gl. I narrowly lanceolate, acuminate; II ⅓ longer, oblong-lanceolate, rather shorter than III; fl. gls. ovate-lanceolate, glabrous, from entire to 2-dentate or cleft nearly ⅓ way down; callus bearded; awn dorsal rather above the middle but below the cleft of the gl., and twice to thrice its length, slender, column twisted then bent and more or less recurved; keels of palea with long close-set fine cilia. *Lodicules* narrow, cleft. *Anthers* linear. *Ovary* obovoid or pyriform, top densely hirsute.—A very variable plant. Some of the Khasian specimens have stems 5 ft. high, and as thick as a goose-quill below, others are much smaller and very slender. The fl. gl. are most scabrid in Ceylon and Peninsular specimens, least so in Sikkim ones which pass into var. *Roylei*. The nearest European species is *A. Besseri*, Gmel. (*A. sempervirens*, Bess. non Vill.) of Hungary, a rigid species with narrower scabrid leaves, usually longer spikelets and obtuse erose flg. glumes.

A. aspera, proper; leaf sheaths smooth, panicle glabrous, fl. gl. more or less scaberulous entire 2-dentate or 2-fld., lobes not awned.—Sikkim, the Khasia and Nilghiri Hills and Ceylon.

Var. *Roylei*, Hook. f.; leaf-sheaths glabrous or softly pubescent, panicle glabrous or puberulous, fl. gls. quite smooth tip entire 2-toothed or 2-fid almost to the awn into acuminate or long-awned lobes, or tip split into 3–4 short unequal bristles. A. aspera, *Griseb. l. c.* A. pubescens, *Royle Ill. Himal. Pl.* 417; *Duthie l. c.* 32. Trisetum virescens, *Nees ex Steud. Syn. Gram.* 226; *Duthie Grass. N.W. Ind.* 31 (*non Regel*).—Avena, *Wall. Cat.* n. 3793.—Kashmir to Nepal, alt. 6–12,000 ft. A very common grass, often 4–5 ft. high with leaves half an inch broad.

Var. *parviflora*, Hook. f.; sheaths villously pubescent, branches of panicle short scabrid, spikelets crowded shortly pedicelled ¼ in. long, gl. II 3-nerved, fl. gls. 2-dentate smooth.—Sikkim, on Singalela, alt. 11,000 ft., *Clarke*.

Var. ? *Schmidii*, Hook. f.; stem slender, leaves chiefly radical, sheaths softly hairy, panicle very contracted, rachis short branches and very short pedicels puberulous or scaberulous, spikelets ⅓ in. 2–3-fld., flg. gls. very scabrid 5-nerved tip 2-aristate, keels of palea shortly ciliate.—Nilghiri Hills, *Schmid*; Ootacamund, alt. 7500–8000 ft., *Clarke*.—Possibly a distinct species. One specimen has 7-nerved fl. gls.

6. **A. polyneura,** *Hook. f.*; panicle pyramidal, branches long few-fld.

lower horizontally spreading, spikelets ¾ in. long, glumes opaque all with very strong close-set raised nerves, I 1–3-nerved, II 5-nerved, fl. gls. ovate-lanceolate tip 2-dentate 7–9-nerved, keels of palea pectinately ciliate.

Nilghiri Hills; Dodabetta, alt. 8000 ft., *Gamble*,

Stem 2–3 ft., rather stout, strict. *Leaves* strict, narrow, convolute; sheaths deeply grooved, lower sparsely hairy; ligule very short, truncate. *Panicle* 8 in., and nearly as broad; branches 2–3-nate, smooth. *Spikelets* reddish-brown.—Possibly only a state of *aspera*, as more specimens may prove; but of a very different habit and conspicuous for the large spikelets and opaque ribbed glumes.

Sect. IV. Perennials. *Spikelets* erect. *Fl. gls.* 3–5-nerved. *Ovary* quite glabrous.

7. **A. subspicata,** *Clairv. Man. Herb.* 17; pubescent or tomentose, ligule oblong, panicle spiciform or ovoid strict erect dense-fld. rarely effuse, spikelets ⅙–¼ in. 2–3-fld. ovoid-oblong very shortly pedicelled, gl. I and II subequal or II longest, fl. gls. ovate or ovate-lanceolate 2-cuspidate or shortly 2-aristate 1- or faintly 3-nerved, awn reflexed rather longer than the gl. *Svensk Bot.* t. 722; *Reichb. Ic. Fl. Germ.* i. t. 98; *Griseb. in Goett. Nachr.* (1868) 78; *Ledeb. Fl. Ross.* iv. 418. A. airoides, *Koel. Gram. Gall. & Germ.* 208. A. mollis, *Mich. Fl. Am. Bor.* i. 72. A. phleoides, *Urv. in Mem. Linn. Soc. Par.* iv. (1826) 601. A. toluccensis, *H. B. & K. Nov. Gen. & Sp.* i. 148. Trisetum airoides, *Roem. & Sch. Syst.* ii. 666. T. andinum, *Benth. Pl. Hartw.* 261; *Steud. l. c.* 228. T. antarcticum, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 61 (*non Nees*). T. grœnlandicum & labradoricum, *Steud. Syn. Gram.* 228. T. molle, *Kunth Rev. Gram.* i. 101, *Enum. Pl.* i. 296; *Torrey Fl. N. York*, ii. 452, t. 154; *Steud. l. c.* T. phleoides, *Kunth l. l. c.* 101, 295 (*non Trin.*). T. spiciforme, *Dulac Fl. Haut. Pyren.* 86. T. subspicatum, *Beauv. Agrost.* 88; *Kunth Enum.* i. 295, *Suppl.* 248; *Duthie Grass. N. W. Ind.* 31; *Hook. Fl. Bor. Am.* ii. 244; *Hook. f. Fl. Antarct.* i. 97, ii. 396, *Handb. N. Zeal. Fl.* 335; *Benth. Fl. Austral.* vii. 588; *Steud l. c.* 225. T. toluccense, *Kunth Revis. l. c.* 297, t. 60, *Enum. l. c.* 296; *Steud. l. c.* Aira spicata, *Linn. Sp. Pl. Ed.* II. 95 (*non Ed.* I.); *Fl. Dan.* t. 228. Aira subspicata, *Linn. Syst. Ed.* X. 873; *Host Gram. Austr.* ii. 33, t. 45; *Wulf. in Jacq. Collect.* iii. t. 19, f. 3. Koeleria aristata, *Loisel. Fl. Gall. Ed.* II. i. 66. K. spicata, *Willk. & Lange Prodr. Fl. Hisp.* i. 72. K. subspicata, *Mart. ex Reichb. Fl. Germ. Excurs.* 49.

Alpine and Subalpine Himalaya and Tibet, alt. 10–18,000 ft. (18,500 ft. in Kunawur, *Jacquemont*).—Distrib. Alpine, Arctic, and Antarctic regions.

Stems densely tufted, 6–24 in., strict, stout or slender, always pubescent or tomentose. *Leaves* flat, soft, hairy, rarely glabrate, lower sheaths loose. *Panicle* 2–4 in., from shortly oblong to cylindric, rarely interrupted or lobed with a few very short spreading lower branches. *Spikelets* yellowish-green, purplish, or white, densely imbricating; rachilla short, hairy; gl. I and II more or less unequal, nearly as long as III, keels scaberulous; I 1-nerved; II 3-nerved; fl. gls. glabrous or puberulous, tip sometimes almost entire; callus bearded; awn inserted ⅓–⅙ way below the tip, column slightly twisted but sometimes awn shorter than the gl. and straight; keels of palea scabrid. *Lodicules* oblong, 2-fid. *Anthers* short. *Ovary* fusiform, glabrous. *Grain* fusiform, compressed.

8. **A. Clarkei**, *Hook. f.*; stem very slender and branches of panicle pubescent or tomentose, ligule very short, panicle slender spiciform interrupted, spikelets narrow ⅙–¼ in. 2–3-fld. glabrous sessile or shortly pedicelled, gl. I and II unequal, fl. gls. narrowly lanceolate acuminate tip

2-aristulate 1- or sub 3-nerved, awn longer than the gl. recurved or reflexed column not twisted.

KASHMIR; at Laka and Budrawur, alt. 10–11,000 ft. CHAMBA; Dalhousie, alt. 8700 ft., *Clarke*.

Stem 1–2 ft. *Leaves* 4–8 in., flaccid, softly hairy on both surfaces; sheath with spreading or reflexed soft hairs. *Panicle* 3–5 in., erect or inclined, rachis slender; lower branches solitary or fascicled, rarely 1 in. long. *Spikelets* erect, pale brown, shining, rachilla penicillate with very long hairs; gls. hyaline as in *A. subspicata*, but longer and narrower.—Very near *A. subspicata*, but much more slender, with a longer loose panicle of shining much narrower spikelets, with obsolete side nerves.

9. **A. micans,** *Hook. f.*; stem and rachis of panicle pubescent or tomentose, leaves glabrous, ligule short lacerate, panicle contracted elongate ovoid or linear interrupted dense fld., branches short flowering to the base, spikelets $\frac{1}{6}$ in. densely imbricate silvery hyaline 3–5-fld. quite glabrous, gl. I and II very unequal 3-nerved, fl. gls. lanceolate obscurely 5-nerved, tip acuminate shortly 2-aristate, awn inserted $\frac{1}{3}$ way from the tip very slender as long as the gl. column not twisted.

WESTERN HIMALAYA; Garwhal, banks of the Ganges, alt. 8–10,000 ft., *Duthie*.

Stems 12–18 in., densely tufted, rather stout, leafy. *Leaves* 6–12 in. flat, narrow, rigid, finely acuminate strongly nerved, smooth or scaberulous; sheath quite smooth; ligule reniform, membranous. *Panicle* 3–4 in. by $\frac{1}{2}$–$1\frac{1}{2}$ broad, erect or inclined, strict or subflexuous; lower branches solitary, densely flowering to the base. *Spikelets* very pale greenish yellow; rachilla slender, ciliate; gl. I lanceolate, II $\frac{1}{3}$ longer than I oblong-lanceolate, keels of both scaberulous; fl. gls. with bearded calli; awn straight or recurved; keels of palea minutely scabrid. *Lodicules* narrow, cleft. *Anthers* linear. *Ovary* obovoid, quite smooth, style bases close together.—Quite unlike any other Indian species, but very near *A. virescens*, Regel of Turkestan which has flaccid leaves and an entire tip of fl. gls.

10. **A. flavescens,** *Linn. Sp. Pl.* 80; tall, slender, quite glabrous, ligule long, panicle effuse flexuous inclined or nodding branches capillary few-fld. naked below, spikelets $\frac{1}{3}$ in. 2–3-fld brown shining rachilla slender, gls. spreading, I and II unequal hyaline narrow I 1-nerved, II 3-nerved, fl. gls. narrowly lanceolate 3-nerved tip acuminate 2-aristate, awn stout inserted $\frac{1}{4}$–$\frac{1}{3}$ way below the tip, twice as long as the gl. base twisted. *Fl. Dan.* t. 1507; *Host Gram. Austr.* iii. 27, t. 38; *Engl. Bot.* t. 952; *Knapp Gram. Britt.* t. 89; *Reichb. Ic. Fl. Germ.* t. 99; *Ledeb. Fl. Ross.* iv. 417; *Griseb. in Goett. Nachr.* (1868) 78. Trisetum flavescens, *Beauv. Agrost.* 88; *Kunth Enum. Pl.* i. 298, *Suppl.* 252, t. 19, f. 2; *Boiss. Fl. Orient.* v. 537.

TEMPERATE HIMALAYA; Sikkim, alt. 12–13,000 ft., *J. D. H.*—DISTRIB. Europe N. Asia, Japan, N. Africa.

Stem 2–3 ft. *Leaves* 6–18 in., flat, finely acuminate, more or less hairy; sheaths smooth; ligule elongate, membranous, lacerate. *Panicle* 3–5 in., quite glabrous, lower branches solitary or 2-nate. *Spikelets* larger than in most other species of this section, the awn longer; rachilla nodose below the fl. gls., penicillate with long hairs; gls. I and II lanceolate, acuminate; fl. gls. chartaceous with hyaline margins and tips, keels scaberulous as are the keels of the palea. *Lodicules* short, 2-lobed. *Anthers* small. *Grain* narrow.

11. **A. aenea,** *Hook. f.*; stem glabrous, ligule short rounded, panicle spiciform dense-fld. oblong or linear simple or lobed, branches very short, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. 2–3-fld. densely imbricating sessile or very shortly pedicelled dark or pale brown shining, glumes hyaline I 1-nerved, II 1–3-

nerved, fl. gls. ovate faintly 5-nerved tip acuminate 2-aristate, awn twice as long as the gl. or less reflexed, column twisted. Trisetum aureum, *Nees ex Steud. Syn. Gram.* 225 (*non Tenore*); *Duthie Grass. N.W. Ind.* 3. T. aeneum, *Hack. mss.*

WESTERN HIMALAYA, alt. 11–12,000 ft., from Kashmir to Kumaon.

Stem erect, 1–2 ft., stout or slender. *Leaves* 6–10 by $\frac{1}{6}$–$\frac{1}{4}$ in., glabrous or hairy, as are the sheaths. *Panicle* 3–4 by $\frac{1}{2}$–1 in. diam., erect, strict, or very narrow looser-fld. and flexuous; rachis branches and pedicels quite glabrous. *Spikelets* erect; rachilla penicillate; glumes not widely spreading, all acuminate; I lanceolate; II $\frac{1}{3}$ longer, oblong-lanceolate; fl. gls. rather longer than II, keel scaberulous as are the keels of the palea. *Grain* fusiform, compressed.

12. **A. sikkimensis,** *Hook. f.*; tall, slender, stem and panicle quite glabrous, ligule short rounded, panicle narrow elongate effuse nodding flexuous, branches few-fld. capillary, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. 3–4-fld. sessile or shortly pedicelled pale or brown, rachilla not long, gls. I and II unequal acute hyaline glistening, fl. gls. coriaceous ovate 2-aristate, 1–3 nerved, chartaceous smooth, awn inserted $\frac{1}{6}$–$\frac{1}{3}$ way below the tip as long or nearly twice as long as the gl. reflexed column twisted.

SIKKIM HIMALAYA; Lachen and Lachoong Valleys, alt. 10–11,000 ft., *J. D. H.*

Stem 2–3 ft. *Leaves* 6–12, by $\frac{1}{6}$–$\frac{1}{4}$ in., more or less hairy, flat, flaccid; sheaths glabrous except near the mouth. *Panicle* 6–10 in.; branches subsecund, fascicled, $\frac{1}{2}$–1 in. long, naked below. *Spikelets* usually 4-fld., sometimes nearly as brown as in *A. flavescens.*

13. **A. flaccida,** *Hack. mss.*; very slender, quite glabrous, panicle small open, branches few capillary spreading, spikelets few pedicelled 3-fld. $\frac{1}{4}$ in. long white and rose-colrd., rachilla long slender scaberulous, gls. I and II very unequal subulate-lanceolate, I and II 3-nerved, fl. gls. ovate-lanceolate acute 5-nerved, awn inserted a little below the tip as long as the gl. straight column not twisted.

The PANJAB; Black Mts., alt. 8–9000 ft., *Duthie* (n. 7609 *in part*).

A foot high. *Leaves* 4–6 by $\frac{1}{6}$–$\frac{1}{4}$ in., quite glabrous; ligule short, rounded. *Panicle* 3 in. long, branches rather distant. *Spikelets* erect; gl. I much shorter and narrower than II; fl. gls. smooth, glabrous, chartaceous, white in the lower half pale rose in the upper, margins and tip hyaline, nerves very slender; awn very delicate; keels of narrow palea smooth. *Lodicules* lanceolate. *Ovary* pyriform, quite smooth, style bases rather distant.—Described from a single insufficient specimen.

DOUBTFUL SPECIES.

A. BENGHALENSIS, *Schwaegr. Breit. ex Steud. Nom. Ed.* I. 94. I have no clue to this plant, which is not taken up in Ed. II of Steudel's Nomenclator.

A. PILOSA, *M. Bieb. Fl. Taur. Cauc.* iii. 84; *Griseb. in Goett. Nachr.* (1868) 78 Tibet, *Schlagintweit.*—I have seen no Tibetan specimen of this, for which Griesbach is the authority.

83. DANTHONIA, *DC.*

Annual or perennial grasses. *Spikelets* 2- or more fld. (fls. all perfect or the uppermost male) panicled, erect, not jointed on their pedicels; rachilla hairy and jointed at the base and between the fl. gls., produced beyond

the uppermost gl. *Glumes* 5 or more, I and II empty, subequal, as long as the whole spikelet, persistent, keeled, acute or acuminate; flg. gls. dorsally rounded, ciliate, 7–9-nerved, 2-fid, lobes acute at the base or awned and with a rigid twisted awn in the sinus; palea broad. *Lodicules* 2, fleshy. *Stamens* 3. *Styles* free. *Grain* free within the membranous or hardened gl. and palea.—Species about 100 enumerated.

1. **D. himalaica,** *Hook. f.*; leaves as long as the stem wiry, panicle 3–4 in. contracted few-fld., branches and pedicels very short, spikelets few $\frac{2}{3}$–1 in., 5–6-fld., gls. I and II unequal 6–7-nerved, flg. gls. sparsely hairy 9-nerved, lateral awns 0.

KUNAWAR; Jaunsar, on Lokardi Peak, alt. 8–9000 ft., *Duthie.*

Stems 12–18 in., densely tufted, filiform. *Leaves* convolute, erect, quite smooth, deeply ribbed in the inner surface; sheath short, smooth; ligule $\frac{1}{3}$ in., hyaline, lacerate. *Panicle* of 4–8 erect spikelets; rachis and short erect pedicels, smooth, glabrous. *Gls.* I and II pale brown, much longer than the flg. gls., finely acuminate, margins hyaline, I 6–7-nerved; II longest, 7-nerved; flg. gls. $\frac{1}{3}$–$\frac{1}{2}$ in., pale green, 2-fid; awn straight, base strongly twisted; callus silkily villous; palea short, obtusely 2-lobed, keels scabrid. *Lodicules* clavellate. *Anthers* as long as the palea. *Ovary* ovoid, hirsute, styles short, stigmas long.

2. **D. exilis,** *Hook. f.*; stem and leaves filiform, panicle short contracted racemiform few-fld., branches and pedicels very short, spikelets $\frac{1}{2}$ in. 3–5-fld., gl. I and II unequal 1–3-nerved, fl. gls. villous, lateral awns very short.

KASHMIR; Tilail and Bargil, alt. 9–11,000 ft., *Clarke*; Gurail, alt. 8–9000 ft., *Duthie.*

Stem 3–10 in., densely tufted, very slender. *Leaves* 3–5 in., convolute; ligule short. *Panicles* $\frac{1}{2}$–1 in., erect or cernuous, 6–10-fld., green or brownish, branches and pedicels smooth. *Spikelets* erect; rachilla very short between the upper gls.; gl. I and II scarious, lanceolate, acuminate, 1-nerved or obscurely 3-nerved at the base, I the shortest; flg. gls. much shorter than II, oblong, coriaceous, faintly 7-nerved, cleft nearly to the middle, lateral awns as long as their gl., median twice as long erect; callus densely bearded; palea linear-lanceolate, 2-toothed, sparsely hairy; nerves strong, scabrid. *Grain* obovoid, smooth, glabrous.

3. **D. cachemyriana,** *Jaub. & Sp. Illustr. Pl. Orient.* iv. 46, t. 331; stems ascending from a stout woody stock, leaves very long narrow convolute, panicle contracted, spikelets $\frac{2}{3}$–$\frac{3}{4}$ in., gl. I and II subequal 3–7-nerved, flg. gls. sparsely hairy, lateral awns much longer than gl. II. D. kashmiriana, *Duthie in Atkins. Gaz. N.W. Ind.* 630, *Grass. N.W. Ind.* 32; *Griseb. in Goett. Nachr.* (1868) 78.

TEMPERATE and ALPINE HIMALAYA, and W. TIBET, alt. 10–14,000 ft.

Stem 1–2 ft., densely tufted, or creeping below and clothed with shining sheaths. *Leaves* as long as the stem or longer, erect, flexuous, wiry, glabrous; sheaths glabrous, or lower rarely tomentose; ligule a pubescent ridge. *Panicle* most variable in number and disposition of the spikelets, erect, 4–5 in. long, with 30 or more close erect spikelets $\frac{3}{4}$ in. long, or more lax with fewer (3–4 or more) spikelets on longer or shorter rarely spreading branches and pedicels, the latter smooth hairy or scabrid. *Spikelets* 2–5-fld., erect, pale, rather shining; rachilla more or less hairy; gls. I and II membranous, sometimes purple, rarely very sparsely hairy, keels smooth; I rather the smallest, nerves very variable, more or less trabeculate; flg. gls. much smaller, linear-lanceolate, cleft about $\frac{1}{3}$ way down, 9-nerved; lateral awns as long as the gl. or longer, exserted, median strongly twisted often to

the tip, variable in length, about twice that of gl. II; callus bearded; palea as long as the gl., linear, obtuse, keels nearly smooth. *Anthers* linear. *Grain* narrowly oblong, glabrous.—A very variable plant in panicle but constant in habit. Jaubert and Spach's figure is of a very starved small form, and I have not found in Jacquemont or other specimens the whorl of hairs at the top of the pedicel (base of gl. I and II) which they represent. The nervation of gl. I and II varies remarkably. I find both 3-nerved in Sikkim specimens, both 5-nerved in many Western Himalayan; both sub 7-nerved in Kunawur ones; both 4-nerved in Simla ones; I 3-nerved, II 5-nerved in some Western; I 5-nerved, II 7-nerved in Garwhal; I 5-nerved and II sub 6-nerved in Jacquemont's n. 260, in which the awn is twisted to the tip; both are very sparsely hairy in a few specimens. The lower sheaths are villous in Simla (Hattu) specimens.

Var. *minor*; stems 6–8 in. very slender, leaves filiform, panicle often recurved, spikelets 4–8, gl. I and II often purple 5–7-nerved. Danthonia No. 2. *Herb. Strach. & Winterb.*—Alpine Himalaya, from Garwhal to Sikkim, alt. 12–14,000 ft.

4. **D. Cumminsii,** *Hook. f.*; stem ascending, leaves filiform, panicle small, rachis and pedicels villous, spikelets 3–6 ⅓ in. long very shortly pedicelled, lateral awns of gl. III very short, median not twice as long as gl. II hardly twisted.

Bhotan; Gnatong in the Sikkim frontier, alt. 12,000 ft., *Cummins.*

Possibly a form of *D. cachemyriana*, but the characters are marked. The specimens are curved in a semi-circle, no doubt from growing amongst rocks, as was the case with *Calamagrostis tripilifera*, var. (p. 262).

DOUBTFUL SPECIES OF DANTHONIA.

D. Griffithiana, *C. Muell. in Bot. Zeit.* xiv. (1856) 374.—Khasia Hills, *Griffith.*—Judging by the description this is not a *Danthonia*, but I have formed no idea of what it may be.

84. **DUTHIÆA,** *Hack.*

No. 123 in Clavis, p. 8.

Tufted perennial erect glabrous grasses. *Leaves* linear, subconvolute. *Spikelets* 3–5-fld., often bracteate, in a short simple unilateral raceme, laterally subcompressed, not jointed on the pedicels, uppermost fl. imperfect; rachilla articulate. *Gls.* I and II empty, persistent, lanceolate, acuminate, 7–11-nerved, dorsally rounded; fl. gls. herbaceous, oblanceolate, 7–11-nerved, 2-fid, awned in the sinus, margins membranous, awn half-twisted; palea 2-keeled, keels scabrid, excurrent. *Lodicules* 0. *Stamens* 3. *Ovary* hispid, narrowed into a slender style; stigmas very long, papillose, exserted from the top of the spikelets. *Grain* oblong, crowned with the style, hirsute.—Species 2, Western Himalaya and Affghanistan.

D. bromoides, *Hack. in Verhandl. Zool. Bot. Ges. Wien.* (1895) 200; spikelets 3–5-fld., rachilla hairy, gl. I and II 7–11-nerved margins narrowly hyaline, fl. gls. obtusely 2-lobed dorsally hairy below, style about as long as the stigmas. *Stapf in Hook. Ic. Pl.* t. 2474.

Kashmir, alt. 12–13,000 ft., *Jacquemont, Duthie.* Western Tibet, alt. 12,000 ft., *Thomson, Clarke.* Brenda Pass, Kunawur (*Herb. Saharunpore*).

Stems 18–24 in., slender, compressed, scaberulous above. *Leaves* 6–12 in., rather rigid, cauline very short, flat, acute; sheaths compressed, of uppermost inflated embracing the raceme; ligule oblong. *Raceme* 1–2 in., inclined, rachis scabrid. *Spikelets* 5–6, subsessile, ovoid, about ⅓ in. long (without the awns) green; bracts

scarious; gl. I often faintly nerved; II 7-nerved, subaristate; flg. gls. oblanceolate, hairy below the middle, lobes obtuse; awn $\frac{2}{3}$-1 in., scabrid, obscurely geniculate. *Ovary* narrow, style $\frac{1}{8}$–$\frac{1}{6}$ in. long.—A remarkable grass, the character and affinities of which are discussed at length by Hackel, who places it next to *Bromus*, where it will be found (No. 123) in the clavis of this work, p. 8. The recognition by Dr. Stapf of a second species, *D. oligostachya*, Stapf (Avena oligostachya, *Munro in Journ. Linn. Soc.* xviii. (1880) 108, *name only*, *Aitchison l. c.* xix. (1882) 193, t. 30) proves the position of the genus to be near *Danthonia*, where I had placed it, before its publication by Hackel, when I deferred to that author's high authority.

Tribe VIII. CHLORIDEÆ. (See p. 6.)

84. **MICROCHLOA,** *Br.*

Slender perennial grasses. *Leaves* filiform, convolute. *Spikelets* very narrow, 1-fld., minute, 2-seriate, unilateral on a solitary terminal filiform curved spike, not jointed at the base, awnless; rachilla jointed at the base, not produced beyond gl. III. *Glumes* 3, I and II empty, membranous, 1-nerved, keeled, persistent; III very small, oblong, hyaline, awnless; palea as long as the gl., keels ciliate. *Lodicules* 2, truncate. *Anthers* linear. *Styles* distinct. *Grain* oblong, fusiform, glabrous, free within the hyaline gls.—Species 3, two confined to Africa and the following.

M. setacea, *Br. Prodr.* 208; *H. B. & K. Nov. Gen. & Sp.* i. 84, t. 22; *Beauv. Agrost.* 115, t. 20, f. 8; *Nees Agrost. Bras.* 441; *Fl. Afr. Austr.* 247; *Kunth Enum. Pl.* i. 258, *Suppl.* 201; *Doell in Mart. Fl. Bras.* ii. III. 76, t. 21; *Steud. Syn. Gram.* 202; *Benth. Fl. Hongk.* 428, *Fl. Austral.* vii. 608. M. elongata, *Br. in Wall. Cat.* n. 3807. Rottboellia setacea, *Roxb. Corom. Pl.* ii. 18, t. 132, *Fl. Ind.* i. 357. Nardus indica, *Linn. f. Suppl.* 105.

BENGAL, *Roxburgh*, on walls. NEPAL, *Wallich.* KHASIA HILLS, alt. 4–6000 ft., *J. D. H. & T. T., Clarke.* CENTRAL PROVINCES; Chanda, *Duthie.* NILGHIRI HILLS, *Perrottet.*—DISTRIB. Tropics of Old and New World.

Stems tufted, 6–10 in., wiry. *Leaves* as long as the stem, curved, glabrous or sparsely hairy; ligule very short, ciliate. *Spike* 2–10 in., with the spikelets $\frac{1}{10}$–$\frac{1}{6}$ in. diam.; rachis slender, dorsally rounded. *Spikelets* $\frac{1}{15}$ in., close-set, alternating in two unilateral rows, erect; gls. I and II subequal, lanceolate, acute, twice as long as III, which is obtuse, hairy, nerveless; palea lanceolate, 2-toothed.

85. **GRACILEA,** *Koen.*

Small grasses. *Leaves* short. *Spikelets* 1–2-fld. (fl. unisexual?) collected in turbinate awned deciduous spicate clusters which are secund sessile and jointed on a filiform or capillary flexuous terminal rachis; rachilla not jointed, sometimes produced beyond gl. IV and bearing an imperfect fl. *Glumes* 4–6; I and II narrow, rigid, ciliate with long hairs, narrowed into long rigid scabrid awns, I narrowest; II with broad hyaline margins; III and IV broadly ovate, membranous, scaberulous, 3-nerved, shortly awned, tip entire or 2-cuspidate; palea as broad as the gl., 2-cuspidate. *Lodicules* cuneiform. *Anthers* small. *Grain* oblong, free. —Species, 2 Indian and African.

1. **G. nutans,** *Koen. in Ges. Naturf. Fr. Neue Schrift.* iv. (1803) 218; perennial? leaves lanceolate. Melanocenchris Rothiana, *Nees in*

Proc. Linn. Soc. i. (1841) 95; *Wight Cat.* n. 1768; *Dalz. & Gibs. Bomb. Fl.* 297. M. Perrottetii, *Jaub. & Sp. Ill. Pl. Or.* IV. 39, t. 326. Pommereulla monoeca, *Rottl. l. c.*; *Roth. Nov. Sp.* 33 (monoica); *Kunth Enum. Pl.* i. 321; *Wall. Cat.* n. 8905 *excl.* D.

Mysore and the Carnatic, *Heyne*, &c. Ceylon; Mannar district, *Trimen.*

Stems 6–8 in., stout and decumbent below, erect or geniculately ascending. *Leaves* $\frac{3}{4}$–1 in., narrowed from the subcordate base to the acute tip, rigid, margins setosely serrulate; ligule of short hairs. *Spikes* and clusters of spikelets as in *G. Royleana*, but tip of gl. III entire, IV bicuspidate.

2. **G. Royleana,** *Hook. f.*; annual, leaves filiform. Melanocenchris Royleana, *Nees in Proc. Linn. Soc.* i. (1841) 95; *Aitchis. Cat. Panjab Pl.* 168 (*excl. Syn.*); *Duthie Grass. N.W. Ind.* 33, *Fodd. Grass. N. Ind.* 54, t. 67; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* viii. (1893) 370. M. Jacquemontii, *Jaub. & Sp. Ill. Pl. Or.* iv. 36. Pommereulla monoica, *Wall. Cat.* n. 8905 D. P. Royleana, *Steud. Nom. Ed.* II. ii. 379. Amphipogon humilis, *Herb. Ham. ex Wall. Cat. l. c.*—Roylea, *Nees ex Steud. l. c.* 475.

The Panjab Plain, *Hamilton, Royle*, &c., eastwd. to Delhi, *Clarke.* Rajpootana, Central India, the Concan, Canara, and Scind.—Distrib. Socotra, Nubia.

Stems 3–8 in., densely tufted, very slender. *Leaves* 1–2 in., flat or convolute, glabrous or margins below and sheaths setulose; ligule a ridge of hairs. *Spikes* filiform, 1–2 in., flexuous, often reclined or recurved; rachis 3-gonous, smooth; clusters of spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long including the awns, green or purple; awns of gl. I and II longer than the gls., of III very short.

Var. *plumosa*; clusters of spikelets $\frac{1}{2}$ in. including the awns. M. plumosa, *Jaub. & Sp. l. c.* 37; *Hochst. in Flora* (1855) 273, 417. Penuisetum plumosum, *Hochst. ex Steud. Syn. Gram.* 201. Ptilonema plumosum, *Steud. l. c.* Eutriana abyssinica, *Br. ex Fresen. in Mus. Senkenb.* ii. (1837) 142.—The Panjab, Jhelum River, *Aitchison.* Scind, *Stocks.* Arabia, Abyssinia.

86. **ENTEROPOGON,** *Nees.*

Slender perennial grasses. *Leaves* long, very narrow. *Spikelets* very narrow, 1–2-fld. (lower fl. perfect upper if present male or neuter) unilateral in a solitary terminal slender spike, not jointed at the base; rachilla jointed at the base. *Glumes* 3 or 4; I and II unequal, narrow, hyaline, 1-nerved, persistent; III much larger, linear, rigid, scabrid, dorsally rounded, 3-nerved, tip entire, or acutely 2-fid with a short erect awn in the cleft; callus bearded; palea lanceolate, 2-toothed, keels scabrid. *Lodicules* 2. *Anthers* very long. *Styles* distinct. *Grain* narrow, free within the hardened gls.—Species, an African, and the following.

E. melicoides, *Nees in Lindl. Introd. Nat. Syst. Ed.* II. 449; *Wall. Cat.* n. 8893; *Wight Cat.* n. 1757; *Trim. Cat. Ceyl. Pl.* 109. Eutriana enteropogon, *Steud. Syn. Gram.* 216. Ischæmum melicoides, *Koen. ex Rottl. in Ges. Naturf. Neue Fr. Schrift.* iv. (1803) 211. Ctenium seychellense, *Baker Fl. Maurit.* 452. Festuca mysorensis, *Heyne ex Roem. & Sch. Syst.* ii. 600. ?Rottboellia triacantha, *Roth. Nov. Sp.* 43. R. pilosa, *Roth. in Roem. & Sch. l. c.* 785.

Mysore, *Heyne, Wight.* Burma; Shan Hills, *Collett.* Ceylon, *Trimen.*—Distrib. Seychelle Islds.

Stems 1–3 ft., densely tufted, wiry. *Leaves* nearly as long as the stem, up to ¼ in. broad, flat or convolute, tip capillary; ligule of long hairs. *Spikes* 6–10 in., flexuous or curved, rachis dorsally rounded. *Spikelets* ⅛–¼ in., loosely imbricate, rarely 2-seriate; gls. I and II glistening; III opaque, with a very thick raised midrib; awn about = the gl.

87. **TRIPOGON**, *Roth.*

Slender densely tufted grasses. *Leaves* usually convolute. *Spikelets* many-fld. (fl. all but 1–2 terminal perfect), 2-seriate and unilateral on a very slender terminal spike, not jointed at the base; rachilla produced between the glumes, jointed at the base. *Glumes* many, I and II unequal, distantly superposed, 1-nerved, empty, persistent; I usually lodged in a furrow of the rachis, and toothed or lobed on one side; II entire or notched below the mucronate or apiculate tip; III and following ovate, dorsally convex, 2-fid, and awned in the cleft, or 4-fid with the outer lobes awned, the inner membranous and rarely awned; palea broad or narrow, complicate. *Lodicules* 2. *Stamens* 3. *Styles* very short. *Grain* very narrow, free.—Species about 10, trop. and subtrop. Asia and Africa.

The species of *Tripogon* are very closely allied, and though dissimilar in many respects, are so variable in all, that they form an almost inextricable plexus. The most distinct are *T. capillatus*, *pauperculus*, *Wightii*, and *abyssinicus*, of which the latter almost passes into *Jacquemontii*. Glume I is remarkable from being in most species inæquilateral, one margin being deeply notched, or dilated suddenly below the middle into a wing or lobe or segment, which is sometimes displaced and appears as a small 3rd or lowest empty glume. The subequal symmetrical glumes of *T. pauperculus* and *Wightii* are unusual in the genus.—The length of the awns, and of the lobes of the gl. III vary in each species; and there is every intermediate between the species with two simple awned lobes one on each side of the median awn, as in *T. trifidus*, and the quadrifid top of the gl. of *T. filiformis*.—The species grow promiscuously on rocks or trunks of trees.

* Flg. glumes simply 2-fid with an interposed awn, the lobes awned or not.

† *Awn as long or longer than its glume.*

1. **T. capillatus,** *Jaub. & Spach. Illustr. Fl. Orient.* iv. 47, t. 332; gl. I and II narrowly lanceolate acuminate or awned, III villous at the base, awn many times longer than its gl. flexuous. T. capitatus (err. typ.) *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 371.

Behar; on Parusnath, *J. D. H.*, *Clarke*. Western Ghats; from the Concan to the Nilghiri Hills, *Jacquemont*, &c.

Stem very slender. *Leaves* 6–10 in., convolute. *Spike* 6–12 in., filiform or capillary, flexuous. *Spikelets* remote, $\frac{1}{10}$–$\frac{1}{6}$ in., few-fld., green; gl. I sometimes very minute, at others nearly as long as II, both sometimes awned, membranous with a broad defined nerve; lateral teeth of III shortly awned; median awn so slender as to be barely visible.

2. **T. pauperculus**, *Stapf in Hook. Ic. Pl.* t. 2442; dwarf, stems capillary, gl. I and II lanceolate subaristately acuminate symmetrical, III villous at the base, lateral lobes long-awned median-awn not twice as long as the gl.

Western Ghats; near Poona, on stems of trees, *Woodrow*.

Stems 2–3 in., densely tufted, leafy to the tip. *Leaves* setaceous, involute, upper

much longer than the spike, acute; sheaths striate, lower lax; ligule ovate, obtuse. *Spikelets* 1–3, remote, 1–4-fld.; gl. I and II 1-nerved, gl. I shorter than II; fig. gls. 1–4 with 1–2 empty above them, linear-oblong, 3-nerved; lateral lobes with capillary awns; median awn twisted at the base; palea oblong, keels ciliolate. *Anthers* minute, subglobose. *Grain* narrowly linear, cylindric.

3. **T. trifidus,** *Munro, ex Stapf in Kew Bulletin* (1892) p. 85; spikelets $\frac{1}{6}$–$\frac{1}{2}$ in., gl. I lobed on one side, II narrowly lanceolate acuminate entire or notched below the tip, III villous at the base, awn twice as long as the gl. or longer.

Sikkim Himalaya, alt. 5–6000 ft., *J. D. H.* Mishmi Hills, *Griffith.* Khasia Hills, alt. 4–5500 ft., *Griffith.* (*Kew Distrib.* n. 6633, 6634).—Distrib. Tonkin.

Stem 8–18 in. *Leaves* 6–10 in. *Spikes* 2–12 in., stout or slender. *Spikelets* 3, close or distant, 4–10-fld.; gl. I lanceolate, acuminate or aristate, broadly lobed on one side, the lobe sometimes detached; II much longer, lanceolate, acuminate or 2-toothed with a short awn; III and following bearded at the base; lateral lobes simple, lanceolate, and awned or irregularly toothed in the inner margins, or rarely with a small tooth at its inner base; awn usually twice or thrice as long as the glume, erect and flexuous, or recurved; palea elliptic-oblong, obtuse, keels scabrid.—In the Sikkim specimens gl. I and II are sometimes very long lanceolate aristately acuminate with the lobe of I placed lower down, in others gl. I is much shorter than II, with a broad lateral lobe towards its base; in others again gl. I is deeply notched on one side towards the tip only; gl. II is 2-toothed below the tip and has 5 contiguous strands on the thickened disk; gl. III and its palea are longer and narrower than in any Khasia form, where, however, the plant is so variable that I hesitate to regard the Sikkim one as a different species.

4. **T. Wightii,** *Hook. f.*; spikelets 1–1½ in. 10–30-fld., gl. I and II subequal linear-oblong tip 2-toothed and mucronate, awn recurved as long or twice as long as its gl.

Mysore; at Bellary (1834) *Wight* (n. 1793 ?).

Spikes 6–8 in., rachis as stout as a sparrow's quill. *Spikelets* 10–12, from ½–1½ in. apart; gl. I and II linear-oblong, membranous, hyaline, with a strong defined midrib; III rather narrow, base bearded, lateral lobes lanceolate not awned; palea oblong, keels obscurely scabrid.—A very distinct species, of which there are only spikes in Wight's Herbarium. Bellary is a botanically unexplored district.

†† *Awn shorter than its gl.*

5. **T. Lisboæ,** *Stapf in Kew Bulletin* (1892) 86; spikelets $\frac{1}{8}$–$\frac{1}{2}$ in. 5–12-fld., gl. I lanceolate obtusely toothed on one side, II twice as long linear-oblong coriaceous apiculate, awn of III very short. Leptochloa tripogonoides, *Munro mss. ex Lisboa l. c.* Tripogon, n. 5, *Herb. Ind. Or. H.f. & T.* Tripogon sp. nov., *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 370.

Rajputana; Mt. Abu, *Duthie.* The Concan, Canara, and Mysore, *Jacquemont,* &c.

Stem stout or slender, in Jacquemont's specimen 3 ft. high and as thick as a duck's quill below. *Leaves* 1–2 ft. by $\frac{1}{6}$–$\frac{1}{3}$ in., quite smooth, flat or convolute. *Spikes* 6–10 in.; rachis stout or slender, strict. *Spikelets* usually densely crowded; glumes coriaceous; lobes of III short membranous not awned, base very shortly bearded; awn ¼ the length of its gl. or shorter; palea oblong, keels scaberulous.—The difference in stoutness of stem and spike, and of size of the spikelets is remarkable.

6. **T. Jacquemontii,** *Stapf in Kew Bulletin* (1892) 85; spikelets $\frac{1}{8}$–$\frac{3}{4}$ in. 10–20-fld., gl. I lanceolate lobed on one side, II $\frac{1}{3}$ longer ovate-

lanceolate coriaceous nerve broad or narrow 2-toothed below the tip, awn half as long as its gl. or shorter. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 370. T. bengalensis, *Munro mss.*

BENGAL; *Griffith* (*Kew Distrib.* n. 6636). MALWA, the CONCAN and DECCAN, *Jacquemont*, &c.

Stem very slender, 1–2 ft. *Leaves* filiform. *Spikes* 6–10 in., slender. *Spikelets* crowded or not; glumes subcoriaceous, uppermost flowerless; lobes of III ovate, acute, not awned, base shortly bearded; awn straight, variable in length; palea oblong, keels scaberulous.

Var. *submuticus*; gl. I subulate-lanceolate slightly oblique towards the base very much smaller and narrower than II, awn hardly longer than the lobes of the gl. T. submutica, *Hack. in Herb. Duthie.*—Western Himalaya; below Kotgurh, *Thomson.* Simla, alt. 7–8000 ft., *Duthie.*—The habitat is far removed from that of all other species. Duthie's specimen has the excessively slender habit and all other characters of the type but those above given. Thomson's are much shorter, with shorter leaves, and are intermediate between *Jacquemont's* and the following.

7. **T. abyssinicus,** *Nees ex Steud. Syn. Gram.* 301; dwarf, very slender, spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. 6–8-fld., gl. I very small ovate or subulate-lanceolate unequal or lobulate-sided, II coriaceous linear-oblong 2–3-toothed below the tip, III 2-toothed at the truncate tip, awn minute. T. minimus, *Hochst. ex Steud. l. c.* T. bromoides, *Benth. in Gen. Pl.* iii. 1200; *Duthie Grass N.W. Ind.* 33 (*not of Roth.*). T. festucoides, *Clarke ex Duthie l. c.* Danthonia leptophylla, *A. Rich. Tent. Fl. Abyss.* ii. 421. Festuca filiformis, *Steud. l. c.* Catapodium filiforme, *Nees ex Steud. l. c.* C. fusiforme, *Benth. in Journ. Linn. Soc.* xix. (1881) 128 (*error for filiforme*).

WESTERN HIMALAYA; from Kashmir to Simla, alt. 5–7000 ft., *Royle*, &c. WESTERN PANJAB, *Stewart*, &c.—DISTRIB. Affghan., Tropical Africa.

Stem 6–10 in. *Leaves* 2–6 in., filiform. *Spikelets* always very small and usually rather distant; glumes rather thin, narrow; I membranous, nerve strong; II linear-oblong, with a narrow membranous margin, base bearded, tip sometimes erose and 2-mucronate.

** Fl. glumes 4-fid, outer lobes awned or not, inner membranous sometimes very short or truncate.

8. **T. bromoides,** *Roth. Nov. Sp.* 49; spikes long or short, spikelets $\frac{1}{6}$–$\frac{1}{2}$ in. few- or many-fld., gl. I ovate or lanceolate deeply notched on one side, II oblong-lanceolate bifid with a short awn in the cleft, III with small awned outer lobes broad ovate acute, inner and median awn shorter than the gl. *Wall. Cat.* n. 8887; *Wight Cat.* n. 1793; *Steud. Syn. Gram.* 301; *Stapf in Kew Bullet.* (1891) 85. T. festucoides, *Jaub. & Spach Ill. Fl. Orient.* iv. 49, t. 333. T. Griffithii, *Wight & Arn. ex Wight Cat.* n. 2658; *Nees ex Steud. l. c.* 301. T. lanatus, *Hochst. ex Steud. l. c.* T. Neesianus, *Wight & Arn. ex Wight Cat.* n. 2059. T. zeylanicus, *Nees ex Wight Cat.* n. 2360; *Steud. l. c.*; *Thwaites Enum.* 374; *Trim. Cat. Ceyl. Pl.* 109. Triathera bromoides, *Roth. ex Kunth l. c.* Bromus Myurus & Festuca mysurensis, *Herb. Heyne.* Plagiolytrum calycinum, *Nees in Proc. Linn. Soc.* i. 95; *Wight Cat.* n. 1793 & 2059. Avena mysorensis, *Spreng. Syst.* i. 337.

MALABAR GHATS; from Belgaum southward, alt. 4–7000 ft. CEYLON; in the elevated districts.

Stems 6–18 in., stout or slender. *Leaves* usually short, but sometimes as long as the stem, flat or convolute, and filiform. *Spike* 3–8 in. *Spikelets* very variable, close or distant. *Gls.* I membranous, nerve stout; II membranous, or coriaceous

with broad membranous margins, more deeply notched or bifid at the apex than in any other species; III and following bearded at the base, broadly ovate, strongly 3-nerved, cleft half way down, outer lobes small placed low down and margined with their awns half as long as the gl. or longer, inner lobes often half as long as the gl., much larger than in any other species; awn rarely as long as its gl.

Var. *major*, Stapf mss.; stem 2–4 ft., leaves 5–6 in. narrow flat spreading, spike 4–6 in., spikelets $\frac{2}{3}$ in. bifarious 16–20-fld.—Nilghiri Hills, Nadavattam, alt. 6000 ft., *Lawson.* Pulney Hills, *Wight.*

Var. *longifolius*; stem 2 ft., leaves filiform as long as the stem, spike 3 in., spikelets $\frac{1}{3}$ in. secund 8–10 fld.—Nilghiri and Pulney Hills.

9. **T. filiformis,** *Nees ex Steud. Syn. Gram.* 301; very slender, leaves filiform as long as the stem, spikes 3–10 in., spikelets $\frac{1}{8}$–$\frac{1}{3}$ in., gl. I ovate broadly lobed on one side, II linear-oblong or lanceolate 2-toothed below the tip, III with small shortly awned outer lobes, and short or long obtuse acute or awned inner, median awn twice as long as its gl. or longer. *Duthie Grass. N.W. Ind.* 33. T. semitruncatus, *Nees*, & T. unidentatus, *Nees ex Steud. l. c.*; *Duthie l. c.* Plagiolytrum filiforme and unidentatum, *Nees in Proc. Linn. S.* i. 95. Catapodium filiforme, *Nees ex Duthie l. c.* —Tripogon, *Wall. Cat.* 8888, 8889.

Temperate Himalaya, from Dalhousie to Bhotan, alt. 5–10,000 ft. Khasia Hills, alt. 5–5500 ft., *Wallich*, &c.

Habit of *T. trifidus* and only to be distinguished by the acute obtuse or awned long or short teeth or lobes between the 3 awns of gl. III, and perhaps only a form of that plant. The longer awns and minute teeth of the top of gl. II best distinguish it from *T. bromoides.*

Var. *tenuispica*; spike very slender, rachis filiform, spikelets very small pale, awn of gl. III long and slender. Tripogon, *Wall. Cat.* n. 8892.—N.W. Himal., Sikkim and the Khasia Hills.

88. **CYNODON,** *Pers.*

Perennial creeping grasses. *Leaves* narrow, flat. *Spikelets* minute, 1-fld., 1–2-seriate, unilateral on 3–6 digitate slender spikes, not jointed at the base; rachilla jointed at the base, not produced beyond gl. III or at its back only. *Glumes* 3, I and II empty, thin, keeled, persistent or separately deciduous; III broader, membranous, awnless; palea as long, 2-nerved. *Lodicules* 2, short. *Anthers* large. *Styles* distinct. *Grain* oblong, free within the gls.—Species 4, 3 Australian and the following.

C. dactylon, *Pers. Syn.* i. 85; gl. I and II shorter than III, rachilla produced at the base of gl. III dorsally as a minute bristle. *Kunth Enum. Pl.* i. 259; *Suppl.* 203, t. 16, f. 1; *Reichb. Ic. Fl. Germ.* t. 26; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 19; *Wall. Cat.* n. 3803; *Dalz. & Gibs. Bomb. Fl.* 297; *Griff. Notul.* iii. 50, *Ic. Pl. Asiat.* t. 139, f. 204; *Thwaites Enum. Pl. Zeyl.* 371; *Trim. Cat. Ceyl. Pl.* 109; *Aitchis. Cat. Panjab. Pl.* 160; *Duthie Grass. N.W. Ind.* 32, *Fodd. Grass. N. Ind.* 52; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 366; *Benth. Fl. Hongk.* 428; *Fl. Austral.* vii. 609. C. erectus, *Presl Rel Hænk.* i. 290, *Kunth l. c.* 260. C. filiformis, *Voigt Hort. Suburb. Calc.* 712. C. linearis, *Willd. Enum. Hort. Berol.* 90; *Wight Cat.* n. 1750. C. maritimus, *H. B. & K. Nov. Gen. & Sp.* i. 170. C. occidentalis & portoricensis, *Willd. ex Steud. Nom. Ed.* II. i. 463. C. radiatus, *Roth. Nov. Pl. Sp.* 38; *Kunth l. c.* 260. C. repens, *Dulac Fl. Haut. Pyren.* 76. C. sarmentosus, *S. F. Gray Nat. Arr. Brit. Pl.* ii. 100. C. stellatus, *Willd. Enum. Hort. Berol.* 90; *Kunth l. c.* 260. C. virgatus,

Nees ex Steud. Syn. Gram. 213. Chloris Cynodon, *Trin. Gram. Unifl.* 229. Chlor. maritima, *Trin. l. c.* 226. Fibichia umbellata, *Koel. Gram. Gall. & Germ.* 308. Dactylon officinale, *Vill. Hist. Pl. Dauph.* ii. 69. Digitaria Dactylon, *Scop. Fl. Carn. Ed.* II. i. 52. D. littoralis, *Salisb. Prodr.* 19. D. maritima & radiata, *Spreng. l. c.* 272. D. stolonifera, *Schrad. Fl. Germ.* i. 165, t. 3, f. 9. Panicum dactylon, *Linn. Sp. Pl.* 58; *Host Gram. Austr.* ii. 15, t. 18; *Sibth. Fl. Græc* 45, t. 60; *Engl. Bot.* t. 840; *Knapp Gram. Britt.* t. 13; *Grah. Cat. Bomb. Pl.* 236; *Roxb. Fl. Ind.* i. 289. P. lineare, *Burm. Fl. Ind.* 25, t. 10, f. 2. Paspalum dactylon, *DC. Fl. Franc.* iii. 16. Pasp. præcox, *Walt. Fl. Carol.* 75. Pasp. umbellatum, *Lam. Illust.* i. 177. Agrostis bermudiana, *Tussac ex Kunth l. c.* 259. A. filiformis, *Koen. ex Kunth l. c.* 261. A. linearis, *Retz. Obs.* iv. 19. A. stellata, *Willd. Sp. Pl.* i. 376.—*Rheede Hort. Mal.* xii. t. 47.

Throughout INDIA, BURMA and CEYLON, ascending to 5000 ft. in the Himalaya. —DISTRIB. All warm countries.

Stem prostrate, often widely creeping and forming matted tufts with short ascending branches. *Leaves* short, subulate, glaucous; ligule hairy. *Spikes* 2–5, 1–2 in., radiating, green or purplish; rachis very slender. *Spikelets* about $\frac{1}{12}$–$\frac{1}{10}$ in.; gl. I and II spreading, ovate, acute, keels scabrid; III much larger cymbiform, keel and margin scabrid. *Grain* laterally compressed.—This plant is absent in Herb. Wallich. (Cat. n. 3803).

89. **CHLORIS,** *Sw.*

Perennial rarely annual grasses. *Leaves* flat or convolute. *Spikelets* 1-fld., 2-seriate, unilateral on solitary geminate fascicled digitate or whorled terminal erect or radiating spikes, not jointed at the base; rachilla jointed at the base, sometimes produced beyond gl. III and bearing one or more empty gls. *Glumes* 3 (with 1 or more upper neuter), I and II unequal, 1-nerved, narrow, keeled, acute mucronate or II awned; III 1–3-nerved, acute obtuse or 2-fid, usually awned; palea rather shorter, 2-nerved, complicate. *Lodicules* 2. *Anthers* small. *Styles* free. *Grain* narrow, free.—Species about 40, warm regions.

This genus is wanting in the Wallichian Herbarium at the Linnean Society.—I find no character by which *Schœnefeldia*, Kunth, can be separated generically from *Chloris*.

* Spikelets 1-fld. with no rudiment of another. Rachis of spike flattened.

1. **C. pallida,** *Hook. f.*; annual, very slender, spikes 1–3 $\frac{1}{5}$ in. broad, awn very long capillary. Schœnefeldia pallida, *Edgew. in Journ As. Soc. Beng.* xxi. (1852) 161, 183; *Aitchis. Cat. Panjab Pl.* 166; *Duthie Grass. N.W. Ind.* 32, *Fodd. Grass. N. Ind.* 52, t. 64. S. gracilis, *Kunth Revis. Gram.* i. 283, t. 53; *Enum Pl.* i. 258; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 365.

BUNDELKUND, *Edgeworth.* CENTRAL INDIA, *King.*

Stem 10–18 in., simple or branched, almost filiform. *Leaves* 6–8 in., very narrow, flaccid, tips capillary; ligule a few hairs. *Spike* 3–5 in., golden-yellow, erect; rachis flattened, serrulate. *Spikelets* $\frac{1}{12}$ in., subsessile, gl. I and II ovate-lanceolate, subaristately acuminate, 1-nerved, keels ciliate; I $\frac{1}{4}$ shorter than II; III rather longer than I, sessile, ovate, 1-nerved, hairy, base bearded, tip minutely notched; awn $\frac{2}{3}$–1 in. long, capillary, curved; palea narrow, keels ciliate, tip 2-toothed. *Grain* very slender, acute, pericarp loose.—I have seen no authentic

specimen of Edgeworth's plant, but have received one so named from Dr. King. It agrees with Edgeworth's characters except in respect of an obscure passage in that author's description which reads as if gl. III was much shorter than II.

2. **C. myosuroides,** *Hook. f.*; annual, spikes solitary or geminate $\frac{1}{8}$ in. broad, awn very long capillary.

Gangetic Plain; ravines near Etawah, *Duthie.*

A much smaller plant than *C. pallida*, 6–12 in. high, with very narrow spikes 2–3 in. long, often recurved, smaller spikelets and shorter awns, $\frac{1}{4}$–$\frac{2}{3}$ in. long, but perhaps only a variety.

** Spikelets 1-fld., rachilla produced beyond the flg. gl. and bearing one or two awns. Rachis of spike terete or angular.

3. **C. delicatula**, *Clarke mss.*; annual, spikes 5–10 capillary $1\frac{1}{2}$–2 in. long alternate on the tip of the stem, awns $\frac{1}{8}$–$\frac{1}{6}$ in. straight.

Chota Nagpore; Mandu, Hazarabagh, *Clarke.* Pegu-Yomah, *Herb. Kurz.*

Stem 3–12 in., erect, slender, wiry, subsimple. *Leaves* $\frac{1}{2}$–1 in., all cauline, spreading, subulate, concave or convolute; ligule of hairs. *Spikes* erect. *Spikelets* about $\frac{1}{10}$–$\frac{1}{8}$ in.; gl. I very narrow, almost subulate; II $\frac{1}{3}$ longer, rather broader, both setaceously acuminate, keels scaberulous; III oblong, finely hairy, tip 2-lobed; rachilla produced and half as long as the gl., bearing 2-3 capillary awns; palea narrow, 2-toothed, keels glabrous. *Grain* very narrow, cylindric.—The Pegu specimens are larger than Clarke's.

4. **C. incompleta,** *Roth. Nov. Sp.* 60; tall, perennial, spikes 4–10 whorled 4–6 in. long, awns $\frac{1}{4}$ in. straight. *Steud. Syn. Gram.* 207. C. digitata, *Steud. l. c.*; *Duthie Grass. N.W. Ind.* 23; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 369 (*excl. Syn.*). C. radiata, *Heyne ex Roth. l. c.* 61; *Thw. Enum. Pl. Zeyl.* 371; *Trim. Cat. Ceyl. Pl.* 409. C. Roxburghii, *Edgew. in Journ. As. Soc. Beng.* xxi. (1853) 160, 183; *Duthie Fodd. Grass. N. Ind.* 54, t. 65; *Lisboa l. c.* 368. C. tetrameris, *Trin. Gram. Unifl.* 235; *Steud. l. c.* 206. Digitaria elongata, *Spreng. Syst.* i. 271. Gymnopogon digitatus, *Nees in Wight Cat.* n. 1753; *Steud. Nom. Ed.* II. i. 713. Melica digitata, *Roxb. Fl. Ind.* i. 326; *Kunth Enum. Pl.* i. 37. Ctenium digitatum, *Spreng. Syst.* i. 274. Cynodon elongatus, *Trin. in Spreng. N. Entdeck.* ii. 64; *Kunth l. c.* Agrostis filiformis, *Koenig in Herb. Banks. ex Trin. l. c.*

Throughout the Plains of India, from the Panjab to Burma and southward. Ceylon. Andaman Islds., *Kurz.*—Distrib. Affghan., China.

Stem 2–3 ft., or more, stout or slender, often branched, straight or geniculate. *Leaves* 6–12 by $\frac{1}{6}$–$\frac{1}{2}$ in., flat; ligule of long hairs. *Spikes* very slender, spreading. *Spikelets* very variable, $\frac{1}{8}$–$\frac{1}{5}$ in., narrowly lanceolate, green; gl. I not $\frac{1}{4}$ of II which is narrowly lanceolate notched and shortly awned at the tip; III as long as II, ovate-lanceolate, tip 2-toothed, base bearded; palea very narrow, keels nearly smooth; rachilla produced to half the length of the gl., bearing a very minute long awned gl. that is bearded at the base.

*** Spikelets 1-fld.; rachilla produced beyond the flg. gl., and bearing 1–3 reduced empty gls. (In *C. villosa*, the gl. IV contains imperfect anthers.)

† *Spikes* 1–3; *gl. III broadly cuneiform.*

5. **C. tenella,** *Roxb. Fl. Ind.* i. 329; annual, slender, spike solitary, spikelets 3–4-awned, gl. III broadly cuneiform, upper margin truncate naked. *Kunth Enum. Pl.* i. 267; *Spreng. Neue Entdeck.* iii. 126; *Steud.*

Syn. Gram. 204; *Dalz. & Gibs. Bomb. Fl.* 296; ? *Duthie Fodd. Grass. N. Ind.* 54, t. 66; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 368. C. triangulata, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 409; *Steud. l. c.* 203; *Duthie Grass. N.W. Ind.* 33. Ctenium indicum, *Spreng. Syst.* i. 274. Tetrapogon triangularis, *Hochst. Pl. Arab. Schweinf.* n. 967.

RAJPOOTANA; Oodeypore, *Wingate* (*Herb. Duthie*). SCIND, *Stocks*. KHANDEISH, *Dalzell*. SOUTH INDIA, *Roxburgh, Wight*.—DISTRIB. Arabia, Abyssinia.

Stem 10–18 in., weak, branched from the base. *Leaves* 6–10 by $\frac{1}{8}$–$\frac{1}{4}$ in., flaccid; ligule short, truncate. *Spike* 1–2½ in., erect, flat. *Spikelets* large, $\frac{1}{6}$ in. long and more, bifarious; gls. 5 or 6, I and II ovate-lanceolate, hyaline; I acute; II $\frac{1}{3}$ longer, shortly awned; III as long as II, coriaceous, nerves distant from the margin and keel villous; awn subdorsal, straight, spreading; keels of palea finely hairy; IV half as long as III, narrower; V and VI still smaller, fan-shaped, awned.

†† *Spikes* 1–3; *gl. III ovoid, hirsute all over.*

6. **C. villosa,** *Pers. Syn.* i. 87; perennial, stout, spikes 1–3, spikelets 4-awned, gl. III ovoid acute hirsute all over with long hairs, margins hyaline. *Kunth Enum. Pl.* i. 267, *Suppl.* 217, t. 16, f. 3; *Jaub. & Spach Ill. Pl. Orient.* iv. 40, t. 327; *Coss. & Dur. Fl. Alger.* 87; *Steud. Syn. Gram.* 204; *Aitchis. Cat. Panjab Pl.* 167. C. tetrapogon, *Beauv. Agrost.* 158. Tetrapogon villosus, *Desf. Fl. Atlant.* ii. 388, t. 255; *Trin. Fund. Agrost.* 760; *Boiss. Fl. Orient.* v. 555; *Duthie Grass. N.W. Ind.* 33, *Fodd. Grass. N. Ind.* 55, t. 68.

The PANJAB; Peshawur, *Stewart*; Rawul Pindu, *Aitchison*. RAJPOOTANA; Oodeypore, *King*. Multan, *Edgeworth*.—DISTRIB. Westward to the Canaries.

Stem 6–10 in., from a densely-tufted stout woolly base, which is clothed with equitant leaf-sheaths. *Leaves* 1–3 in., very narrow, acute, flat or twisted, rigid; ligule obscure. *Spikes* 1½–2½ in. by $\frac{1}{3}$–$\frac{1}{2}$ in. broad, erect, pale yellow. *Spikelets* $\frac{1}{8}$ in., obconic; gls 5, I and II lanceolate, shortly awned; I acuminate; II $\frac{1}{3}$–$\frac{1}{4}$ longer, tip 2-toothed; III about as long as II, coriaceous, with broad hyaline margins bounded by the lateral nerves, imperfectly triandrous, tip entire or minutely 2-toothed, hairs much longer than the gl. silky; awn spreading, keels of palea scaberulous; IV not half as long as III, also hirsute; V very small, cuneate; VI reduced to an awn.

††† *Spikes* 4–10; *gl. III bearded at the base and on the margins above the middle.*

7. **C. virgata,** *Sw. Fl. Ind. Occ.* i. 203; spikes 6–9, spikelets 2-awned, gl. II tip 2-fid awned in the sinus, III ovate bearded with long hairs above the middle, IV narrowly cuneiform. *Trin. Gram. Unifl.* 136; *Doell in Mart. Fl. Bras.* ii. III. C. compressa, *DC. Cat. Hort. Monsp.* (1813) 94; *Trin. Gram. Unifl.* 230; *Nees Agrost. Bras.* 421, *Fl. Afr. Austr.* 240; *Steud. Syn. Gram.* 204. C. caudata, *Trin. ex Bunge Enum. Pl. Chin. Bor.* 70. C. cryptostachys, *Steud. in Schmidt Fl. Cap. Virid.* 148. C. decora, *Nees in Herb. Royle*; *Steud. l. c.* 205. C. elegans, *Kunth Enum. Pl.* i. 264. C. meccana, *Hochst. & Steud. ex Schult. Ind. Sem. Hort. Hal.* (1843) 7; *Steud. l. c.*; *Boiss. Fl. Orient.* v. 554; *Duthie Grass. N.W. Ind.* 33. C. montana, *Griseb. in Goett. Nachr.* (1868) 84, *Abhandl.* 300; *Duthie l. c.* (*non Roxb*). C. pallida, *Link Hort. Berol.* i. 56, ii. 223. C. penicillata, *Hort. ex Nees l. c.* (*non Poir.*). C. polydactyla, *Durand Diss. Chlorid.* (1808) 14, 22; *Jacq. Eclog. Gram.* 12, t. 9 (*non Sw.*). C. tetrastachys, *Hack. mss.* (*ex Herb. Duthie*). Heterolepis elegans, *Ehrt. ex Boiss. l. c.*; Rabdochloa virgata, *Beauv. Agrost.* 84.—Chloris, *Wall. Cat.* 3212 (*in Herb Benth.*).

Rajpootana, and Upper and Lower Gangetic Plains, and southward to Behar, and Central and Southern India. Western Tibet, *Thomson.* Burma, *Wallich.*—Distrib. Westward to Algeria; China, Mongolia, Trop. and S. Africa and America.

Stem rather stout, flattened, 8–12 in. high, usually leafy, decumbent and much proliferously branched below. *Leaves* rather broad, flat, acute; upper sheaths more or less inflated.—Australian specimen of this in Herb. Kew from Mueller, are ticketed *C. barbata*, Muell., var. with one empty gl. The Western Tibet habitat is remarkable; there are two specimens collected by Thomson, dated by himself at a time he was in Ladak, at an elevation not less than 12,000 ft.

8. **C. barbata,** *Sw. Fl. Ind. Occ.* i. 200; spikes 4–20, rachis scaberulous, spikelets 3-awned. *Jacq. Eclog. Gram.* 10, t. 8; *Kunth Enum. Pl.* i. 264, *Suppl.* 209; *Durand de Chlorid.* 13, 22; *Trin. Diss.* i. 232, *Sp. Gram. Ic.* t. 306; *Nees Agrost. Bras.* 421; *Steud. Syn. Gram.* 204; *Roxb. Fl. Ind.* i. 331; *Grah. Cat. Bomb. Pl.* 234; *Wight Cat.* n. 1764; *Aitch. Cat. Panjab Pl.* 167; *Thw. Enum. Pl. Zeyl.* 371; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 33, *Fodd Grass. N. Ind.* 53, t. 34; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 367; *Griseb. Fl. Brit. W. Ind.* 539; *Benth. Fl. Hongk.* 429, *Fl. Austral.* vii. 613 (*excl. Syn.* decora); *Doell in Mart. Fl. Bras.* ii. III. 67. Andropogon barbatus, *Linn. Pl. Jam. Pugill.* 30, *Mant.* ii. 302.—Chloris, *Wall. Cat.* n. 3812.—*Rheede Hort. Mal.* xii. t. 51.

Throughout the plains of India, Burma, and Ceylon.—Distrib. Tropics generally.

Stem 1–3 ft., stout, erect from a geniculate or from a creeping proliferously branched base, simple or branching above, nodes with often large tufts of leaves having compressed equitant sheaths. *Leaves* 6–18 long, flat; mouth of sheaths ciliate; ligule obscure. *Spikes* ½–4 in., suberect, strict or flexuous. *Spikelets* $\frac{1}{10}$–$\frac{1}{6}$ in., green or red-purple; gls. I and II acuminate, II much the longest; III ovate, more or less densely bearded above the middle and dorsally, tip acute or notched; awn ¼–⅓ in.; III cuneiform, at length globose, ciliate; IV much smaller, globose, awned.—Extremely variable in size and habit.

9. **C. polystachya,** *Roxb. Fl. Ind.* i. 330; spikes many, rachis glabrous, spikelets very minute 3-awned. *Kunth Enum. Pl.* i. 265; *Spreng. Neue Entdeck.* iii. 127; *Grah. Cat Bomb. Pl.* 235; *Wight Cat.* n. 1763; *Duthie Grass. N.W. Ind.* 33, C. Roxburghiana, *Schult. Mant* ii. 239; *Steud. Syn. Gram.* 206.—Chloris, *Wall. Cat.* n. 3811 (*ex Wight l. c.*).

Deccan Peninsula, *Roxburgh, Wight.*

Stem 1–2 ft., ascending from a procumbent base. *Spikes* about 16, 2–3 in. long; gls. I and II lanceolate, acuminate; II much the longest; III ovate, acute, margins ciliate above or nearly glabrous; awn flexuous, IV like III but very much smaller, glabrous; V a minute-awned gl.—Wight's is the only specimen I have seen, it is very much smaller than in Roxburgh's drawing.

10. **C. montana,** *Roxb. Fl. Ind.* i. 329; spikes 2–6, rachis glabrous, spikelets 4-awned. *Kunth Enum. Pl.* i. 265; *Spreng. Neue Entdeck.* iii. 127; *Steud. Syn. Gram.* 204; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 369. C. decora, *Thw. Enum.* 371 (*excl. syn.*). C. barbata, *var.* decora, *Trim. Cat. Ceyl. Pl.* 109. Tetrapogon tetrastachys, *Hack. in Herb. Duthie* (*in part*) n. 7759. Andropogon tetra-aristatus, *Roxb. Ic. ined.* n. 882.—Chloris, *Wall. Cat.* n. 3810.

Mountain districts of Coromandel, *Roxburgh.* Upper and Lower Gangetic Plains, and southward to Ceylon.

Stem erect or geniculately ascending from a creeping base, 4 in. to 2½ ft., simple

or branched. *Leaves* 3–8 in., narrow, finely acuminate; mouth of sheath ciliate; ligule very short. *Spikes* 1–3 in., erect, very pale. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in.; gl. I and II both finely acuminate, or II which is much the largest obtuse and shortly awned; III ovoid, acute, upper margins more or less thickly bearded; IV and V cuneiform, glabrous or ciliate; VI minute, awned.—Very variable in the length of the spikes and size of the spikelets.

11. **C. Wightiana,** *Nees in Wight Cat.* n. 1766; *Steud. Syn. Gram.* 206; spikes 3–5, rachis villous, spikelets 4-awned.—Chloris, *Wall. Cat.* n. 3809.

SOUTHERN INDIA, *Wight.*

Stem 4–6 in., stout, much branched, decumbent and leafy below, sometimes creeping. *Leaves* 2–4 by $\frac{1}{8}$–$\frac{1}{6}$ in., flat, linear, acuminate and sheaths pubescent; ligule of hairs. *Spikes* red-brown, stout. *Spikelets*, gl. I and II ovate-lanceolate; I acuminate; II $\frac{1}{4}$ longer, tip notched mucronate; III as long as II, obliquely broadly ovate in profile, suddenly narrowed into the terminal awn, lateral nerves marginal above and keel villously bearded; palea very broad, keels ciliate; IV like III but smaller; V subglobose, glabrous, VI very minute.

DOUBTFUL AND REJECTED SPECIES.

C. MONOSTACHYA, *Poir. Encycl. Suppl.* ii. 238.—C. distachya (*Kunth Rev. Gram.* i. 291, t. 57. Eleusine monostachya, *Spreng. Syst.* i. 249. Leptochloa? monostachya, *Reaum. & Sch. Syst.* ii. 580. Cynosurus monostachyas, *Vahl Symb.* ii. 20) is a Mauritian grass, not found hitherto in India.

C. PENICILLATA, *Pers. Syn.* i. 87; *Kunth Enum. Pl.* i. 268; *Steud. Syn. Gram* 206. Cynosurus penicillatus, *Vahl Symb.* ii. 21. Eleusine penicillata, *Spreng. Syst.* i. 350.—Vahl's description does not enable me to identify this.

90. **ELEUSINE,** *Gaertn.*

Annual or perennial grasses. *Leaves* long or short. *Spikelets* 3–12-fld. (fl. all but terminal perfect) sessile, 2–3-seriate and secund, forming digitate capitate or whorled spikes, laterally compressed, not jointed at the base; rachilla continuous between the fl. glumes. *Glumes* few or many, keeled, I and II shorter than the flg., subequal or unequal, persistent; I lanceolate; II lanceolate, acute or acuminate, or very broadly ovate, or didymous with a short stou recurved awn; flg. gls. like the empty 3-nerved; palea complicate, keels strong. *Lodicules* 2, cuneate. *Anthers* 3, short. *Styles* short, distinct. *Grain* free, pericarp hyaline, loose. *Seed* rugose.—Species about 7, all warm countries.

The specimens of this genus are absent from the Wallichian Herbarium in the Linnean Society's rooms; the tickets alone existing there.

I. ELEUSINE proper. *Spikelets* densely imbricate, pointing forward. Gl. II obtuse acute or acuminate.

1. **E. indica,** *Gærtn. Fruct.* i. 8; annual, erect, leaves flat, spikes digitate elongate, glumes subacute glabrous. *Lamk. Ill.* i. 203, t. 48; *Kunth Enum. Pl.* i. 273, *Suppl.* 224, t. 16, f. 4; *Steud. Syn. Gram.* 211; *Roxb. Fl. Ind.* i. 345; *Grah. Cat. Bomb. Pl.* 235; *Griff. Notul.* iii. 52, 53, *Ic. Pl. Asiat.* t. 119, f. 156 & t. 150, f. 1; *Thw. Enum. Pl. Zeylan.* 371; *Trimen Cat. Ceyl. Pl.* 109; *Aitchis. Cat. Panjab Pl.* 168; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 57, t. 69; *Miq. Fl. Ind. Bat.* iii. 385; *Wall. Cat.* n. 3816; *Wight Cat.* n. 1758; *Boiss. Fl. Orient.* v. 555; *Benth. Fl. Hongk.* 429, *Fl. Austral.* vii. 615; *Nees Agrost. Bras.* 439, *Fl. Afr. Austr.* 251; *Griseb. Fl. Brit. W. Ind.* 540. E. distachya, *Trin ex Steud.*

Nom. Ed. II. i. 549. E. distans, *Mœnch. Meth.* 210. E. domingensis, *Sieb. ex Schult Mant.* ii. 323. E. Gouini, inæqualis, rigidifolia, & scabra, *Fourn. ex Hemsl. Biol. Centr. Amer.* iii. 565. E. gracilis, *Salisb. Prodr.* 19. E. marginata, *Lindl. in Mitch. Three Exped.* i. 319; *Steud. Syn. Gram.* 212. E. tristachya, *Lamk. l. c.*; *Kunth Revis. Gram.* i. 92, *Enum.* i. 273; *Steud. l. c.* Cynosurus indicus, *Linn. Sp. Pl.* 72. C. Ara, *Herb. Ham. ex Wall. Cat.* n. 3816 I. ?C. pectinatus, *Lamk Encycl.* ii. 188. ?Leptochloa pectinata, *Kunth Revis. Gram.* i. 91, *Enum. Pl.* 272; *Steud. l. c.* 210. Panicum compressum, *Forsk. Fl. Æg. Arab.* 18. Paspalum dissectum, *Kniphof. Cent. Bot. in Orig.* t. 11. Triticum geminatum, *Spreng. Syst.* i. 326. Agropyrum geminatum, *Schult. Mant.* iii. 655.—*Rheede Hort. Mal.* xii. t. 69.

Throughout the low country of INDIA (ascending to 5000 ft. in the Himalaya) to PENANG and CEYLON.—DISTRIB. Tropical Old World; introd. into the New.

Stem 1-2 ft., stout, soft. *Leaves* distichous, narrow, flaccid, acuminate; sheaths flattened, ciliate; ligule obsolete. *Spikes* 5–7, 2–5 in. long, all in a terminal whorl, or with sometimes 1 or 2 lower down. *Spikelets* very variable in size, $\frac{1}{12}$–$\frac{1}{6}$ in., 3–5-fld.; quite glabrous; gl. I small, 1-nerved; II 3-nerved; III and succeeding ovate, subacute. *Grain* oblong; pericarp loose, but persistent; seed oblong rugose.

CULT. FORM. E. CORACANA, *Gaertn. Fruct.* i. 8, t. 1; stem stout 2–5 ft. often as thick as the thumb, leaves broad, spikes very stout up to 6 in. long by $\frac{1}{2}$ in. broad straight or incurved, grain globose. *Lamk. Illustr.* t. 28; *Schreb. Gram.* ii. t. 35; *Trin. Sp. Gram. Ic.* t. 70; *Steud. Syn. Gram.* 211; *Panz. in Muench. Denkschr.* iv. (1811) t. 8; *Nees Fl. Afr. Austr.* 251; *Kunth Enum. Pl.* i. 273, *Suppl.* 225; *Roxb. Fl. Ind.* i. 342; *Wall. Cat.* n. 3817; *Grah. Cat. Bomb. Pl.* 235; *Aitchis. Cat. Panjab Pl.* 168; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Gross. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 57, t. 69, *Field & Gard. Crops*, 15, t. 28; *Miquel Fl. Ind. Bat.* iii. 386; *Lisboa in Journ. Bomb. Nat Hist. Soc.* vii. (1893) 373. E. cerealis, *Salisb. Prodr.* 19. E. sphærosperma, *Stokes Bot. Mat. Med.* i. 49. E. stricta, *Roxb. l. c.* 343; *Kunth l. c.*; *Steud l. c.* E. Tocussa, *Fresen. in Mus. Senkenb.* ii. (1837) 141. Cynosurus coracanus, *Linn. Syst. Ed.* II. 875.—*Rheede Hort. Mal.* xii. t. 78.—Cultivated in all parts of India.

2. **E. flagellifera,** *Nees in Linnæa*, xvi. (1842) 220; perennial, prostrate, proliferously branched, leaves very short glaucous, spikes digitate, gl. II lanceolate mucronate or aristulate, III hairy acute. *Steud. Syn. Gram.* 211; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 57, t. 37; *Boiss. Fl. Orient.* v. 655. E. arabica, *Hochst. ex Steud. l. c.*; *Aitchis. Cat. Panjab Pl.* 167; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 377. E.? stolonifera, *Br. in Salt Abyss. App.* 63. ? Ochthocloa dactyloides, *Edgew. in Journ. As. Soc. Beng.* xi. (1842) 27.

PLAINS of the PANJAB, *Royle, Jacquemont*, &c. SCIND, *Stocks*, &c.—DISTRIB. Affghan. and westward to N. Africa.

Stems stout or slender, smooth, stiff, widely spreading, rooting at the distant thickened leafy nodes, and sending up slender branches; internodes 4–8 in. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in., rigid, recurved, flat or tortuous; ligule hairy. *Spikes* 3–6, 1–$1\frac{1}{2}$ in. long, very variable in breadth, $\frac{1}{6}$–$\frac{1}{3}$ in.; rachis pubescent. *Spikelets* imbricate, subpedicelled, $\frac{1}{8}$–$\frac{1}{3}$ in. long, 4–6-fld., green or brownish; gl. I small, ovate, acute, membranous; II twice as large, coriaceous with membranous margins; III ovate-lanceolate, acuminate, chartaceous, 3-nerved, mid-nerve compound, sides and membranous margins below hairy; palea elliptic-oblong, keels hairy.—*Ochthocloa dactyloides*, Edgew., is a doubtful plant of which I have seen no specimens. It is not included in any of Duthie's works on the Grasses of N.W. India. It might be traced by its habitat. Loodiana, Jassowala, on tumuli with *Capparis aphylla.*

3. **E. brevifolia,** *Br. in Wall. Cat.* n. 3815; annual, stems short

creeping and rooting, leaves small lanceolate acuminate, spikes very many short crowded in globose heads, flg. gls. and palea villously bearded. E. oligostachya, *Herb. Wight*, n. 3332. E. Wallichii, *Munro mss.* Koeleria brevifolia, *Spreng. Pugill.* ii. 21. K. lagopoides, *Panz. ex Spreng. l. c.* Dactylis brevifolia, *Koen. ex Willd. Sp. Pl.* i. 410 (*excl. Syn.*); *Roxb. Fl. Ind.* i. 341; ?*Steud. Syn. Gram.* 298. D. cynosuroides, *Koen. ex Roth. Nov. Sp.* 74 (*non Linn.*). D. geniculata, *Roxb. Ic. Pict. ined.* t. 346 (*non Burm.*). Poa brevifolia, *Kunth Revis. Gram.* i. 111, *Enum. Pl.* i. 324. P. lagopoides, *Nees ex Wight Cat.* n. 1790. Æluropus brevifolius, *Nees ex Steud. Nom. Ed.* II. i. 30; *Herb. Wight Prop.* 1792. Æ. lævis, *Trin. Fund. Agrost.* 143, t. 12. Æ. pubescens, *Steud. Nom. l. c.* Eragrostis brevifolia, *Benth. in Hook. Ic. Pl.* xiv. 51. Triodia cynosuroides, *Spreng. Syst. Veg.* i. 331. Cyperus Coracana, *Herb. Heyne ex Wall. l. c.*

Sandy shores of the COROMANDEL and CARNATIC coasts, *Heyne*, &c.

Annual. *Stems* many, spreading from the root, 2–4 in. long, stout or slender. *Leaves* 1–2 in., flaccid or rigid, lanceolate, acuminate, serrulate; ligule obsolete. *Heads of spikes* quite globose, $\frac{1}{3}$–$\frac{2}{3}$ in. diam., of many (rarely few) 4–10-fld. ovate sessile spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long; gl. I and II subequal, margins hyaline, broadly ovate, acuminate or cuspidate, glabrous; I 1–3-nerved; II 3–5-nerved, nerves close to the middle line; III and following very broadly ovate, cuspidately acuminate, 3-nerved, keel and nerves and keels of ovate palea all villous below the middle. *Anthers* minute. *Styles* long, slender. *Grain* orbicular.—See remarks under *Æluropus.*

4. **E. verticillata,** *Roxb. Fl. Ind.* i. 346; annual, erect, leaves flat, spikes scattered or whorled very many-fld., glumes acute glabrous. *Steud. Syn. Gram.* 211; *Aitchis. Cat. Punjab Pl.* 168; *Duthie Grass. N. W. Ind.* 34, *Fodd. Grass. N. Ind.* 58. t. 70; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 377; *Benth. Fl. Austral.* vii. 616. E. racemosa, *Heyne in Roth. Nov. Sp.* 80. Leptochloa? racemosa & verticillata, *Kunth Revis. Gram.* i. 91, *Enum. Pl.* i. 272; *Steud. l. c.* Aerachne eleusinoides, *Wight & Arn. in Wight Cat.* n. 1760; *Nees ex Steud. l. c.* A. verticillata, *Lindl. Introd. Nat. Syst. Ed.* II. 381.—Eragrostidi affine, *Wall. Cat.* n. 3882, *ex Wight Cat. l. c.*

Plains of INDIA; in pasture ground, *Roxburgh*, &c. KASHMIR, *Clarke.*—DISTRIB. Trop. Asia, Africa, and Australia.

Stem 1–3 ft., stout or slender, simple or branched, soft. *Leaves* rather broad, flaccid, acuminate, glabrous; sheath compressed; ligule a few hairs. *Spikes* few or many, $\frac{1}{2}$–3 in. long, in tiers or whorls, or opposite or alternate, suberect; rachis slender. *Spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in., 8–12-fld., shining; glumes small; I and II broadly ovate, finely acuminate or aristulate; flg. gls. $\frac{1}{12}$ in., very broadly ovate, 3-nerved, keel excurrent, lateral nerves ending in small teeth. *Grain* rugose, pericarp caducous.

II. DACTYLOCTENIUM, *Willd.* (Gen.). *Spikelets* erect, at right angles to the rachis of the spike. *Glume* II short, suborbicular, abruptly shortly awned.

5. **E. ægyptiaca,** *Desf. Fl. Atlant.* i. 85; annual, leaves flat, spikes digitate, glumes rigid cuspidate glabrous. *Roxb. Fl. Ind.* i. 344; *Wall Cat.* n. 3818; *Griff. Notul.* iii 51, *Ic. Pl. Asiat.* t 139, f. 79; *Trim. Cat. Ceyl. Pl.* 109; *Benth. Fl. Austral.* vii. 615; *Duthie Grass. N. W. Ind.* 34, *Fodd. Grass. N. Ind.* 56, t. 35. E. ciliata, *Rafin. in Desv. Journ. Bot.* iv. (1814) 273. E. cruciata, *Lamk. Illustr.* i. 203, t. 48, f. 2. E. mucronata, *Stokes Mat. Med.* i. 150; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 376. E. pectinata, *Moench Meth. Suppl.* 68. E. prostrata, *Spreng. Syst.* i. 350.

E. radulans, *Br. Prodr.* 186. Dactyloctenium ægyptiacum, *Willd. Enum. Hort. Berol.* 1029; *Beauv. Agrost.* 72, t. 15, f. 2; *Kunth Enum. Pl.* i. 261, *Suppl.* ii. 204; *Steud. Syn. Gram.* 211; *Grah. Cat. Bomb. Pl.* 235; *Dalz. & Gibs. Bomb. Fl.* 297; *Thw. Enum. Pl. Zeyl.* 371; *Aitch. Cat. Panjab Pl.* 167; *Miq. Fl. Ind. Bat.* iii. 384; *Boiss. Fl. Orient.* v. 556; *Griseb. Fl. Brit. W. Ind.* 540; *Baker Fl. Maurit.* 452. D. distachyum, *Bojer Hort. Maurit.* 370. D. Figarei, *Notar. in Ann. Sc. Nat. Ser.* III. ix. (1848) 325. D. meridionale, *Ham. Prodr. Pl. Ind. Occ.* 6. D. mucronatum, *Willd. l. c.*; *Trin. Sp. Gram. Ic.* t. 69; *Steud. l. c.*; *Wight Cat.* n. 1761. D. prostratum, *Willd. l. c.*; *Steud. l. c.* D. radulans, *Beauv. Agrost.* 72; *Kunth l. l. c. c.* 262. 204; *Steud. l. c.* Cynosurus ægyptius, *Linn. Sp. Pl.* 72. C. Cavara & Macara, *Hb. Ham. ex Wall. l. c.* B. C. C. distachyus, *Rottl. ex Steud. Nom. Ed.* II. i. 465. Chloris mucronata, *Mich. Fl. Am. Bor.* i. 59. Cenchrus ægyptius, *Beauv. Agrost.* 157. Rhabdochloa mucronata, *Beauv. l. c.* 84. Ægilops saccharinus, *Walt. Fl. Carol.* i. 249.—*Rheede Hort. Mal.* xii. t. 69.

Throughout the low country of INDIA and BURMA, to MALACCA and CEYLON.—DISTRIB. Warm regions of the Old World, introd. into the New.

Stem erect, 6–18 in. high, or prostrate spreading and rooting, often proliferously branched at the thickened nodes. *Leaves* distichous, acute or acuminate, ciliate; sheaths compressed; ligule 0. *Spikes* solitary or 2–5, ½–1 in. long, all terminal, stout, rachis mucronate at the tip by the thickened excurrent midrib. *Spikelets* densely crowded, $\frac{1}{22}$–$\frac{1}{10}$ in. long, 3–4-fld., glabrous; glumes almost pungent; I ovate, acute; II broadly ovate, obliquely cuspidately awned, as are the following, cusps recurved; palea very broad, 2-fid, keels hispid. *Grain* globose, very rough, pericarp evanescent.—Specimens in Herb. Rottler named "*Cynosurus ciliaris, C. distachyus*, nob, an *C. ægyptii*, var.:—sandy shores of the Ocean," are somewhat intermediate between *ægyptiaca* and *aristata*, having the foliage of the former and habit of the latter. This and Wight's n. 1761 b. "*Dactyloct. mucronatum, β. repens = D. prostratum*, Willd.," are the same.

6. **E. aristata,** *Ehrenb. ex Boiss. Fl. Orient.* v. 557; perennial, slender, prostrate, proliferously branched, leaves short glaucous, spikes very short capitate, gl. II abruptly shortly awned. E. glaucophylla, *Munro ex Benth. in Journ. Linn. Soc.* xix. (1881) 107. E. scindica, *Duthie Fodd. Grass. N. Ind.* 58, t. 36; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 377. Dactyloctenium glaucophyllum, *Courb. in Ann. Sc. Nat. Ser.* IV. xviii. (1862) 133. D. scindicum, *Boiss. Diagn. Ser.* II. iv. 131, *Fl. Orient. l. c.*

The PANJAB, RAJPOOTANA, MALWA, SCIND, and BRITISH BELUCHISTAN.—DISTRIB. Affghan., Arabia, Nubia.

Stem smooth, stiff, widely spreading, rooting at the distant thickened woody leafy nodes, and sending up very slender branches 4–12 in. long; internodes 2–4 in. *Leaves* 1–1½ in., acuminate or pungent, margins ciliate with long tubercle-based hairs; basal sheaths hairy; ligule obsolete. *Spikes* 3 or more, ¼–½ in. long, spreading or decurved, ciliate or bearded at the base, midrib of rachis excurrent. *Spikelets* short, 3–4-fld., rachilla glabrous; gl. I and II coriaceous, 1-nerved, margins membranous, I small, broadly oblong, apiculate; II very broad, sometimes didymous when spread open; awn stout, subulate, incurved or recurved; III and following longer than II, very broadly ovate, subacute, glabrous; palea broad, keels scaberulous. *Grain* ovoid, rugose.—Habit of *E. flagellifera*.

91. DINEBRA, *Jacq.*

An annual leafy grass. *Leaves* flat. *Spikelets* 2–3-fld., small, crowded, biseriate on one side of slender spreading or deflexed spikes that are

collected in narrow pyramidal racemes, not jointed at the base; rachilla slender, jointed at the base, produced beyond the fl. gls. and bearing an imperfect gl. *Glumes* 4–5, I and II empty, persistent, much longer than III and IV, lanceolate, awned, 1-nerved, keeled; II $\frac{1}{4}$ longer than I; III and IV very small, broadly ovate, subacute, hyaline, 1-nerved; palea hyaline. *Lodicules* 2. *Anthers* 3, small. *Styles* free. *Grain* ovoid, trigonous, wrinkled, free.

D. arabica, *Jacq. Fragment.* 77, t. 121, f. 1; *Beauv. Agrost.* 98, t. 16, f. 2 (Dineba); *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 34, *Fodd. Grass. N. Ind.* 55; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 372. D. ægyptiaca, *Del. Fl. Ægypt.* 25, t. xi. f. 3 (Dinaeba). D. retroflexa, *Panz. in Denksch. Acad. Muench.* iv. (1813) t. 12; *Boiss. Fl. Orient.* v. 557. Leptochloa arabica, *Kunth Revis. Gram.* i. 91; *Enum. Pl.* i. 271, *Suppl.* 221; *Wight Cat.* n. 1756; *Aitch. Cat. Panjab Pl.* 167. L. calycina, *Kunth l. l. c. c.* 91, 272; *Steud. l. c.* 210; *Dalz. & Gibs. Bomb. Fl.* 297. L. coromandeliana, *Steud. l. c.* 209. Eleusine calycina, *Roxb. Fl. Ind.* i. 346. Cynosurus coromandelianus, *Herb. Rottl.* C. paniculatus, *Herb. Roxb.* C. retroflexus, *Vahl Symb.* ii. 20. Dactylis pasnaloides, *Willd. Enum. Hort. Berol.* 111. D. cynosuroides, *Koen. mss. in Herb. Mus. Britt.* D. madraspatensis, *Herb. Roxb.*—Dinebra, *Wall. Cat.* n. 3814.

WESTERN PENINSULA, from Khandeish and the Carnatic southward. CEYLON, *Trimen* (*introduced*).—DISTRIB. Affghan. and westward to Senegal.

Stems 1–3 ft., tufted, branching from the base, erect or geniculately ascending, leafy throughout. *Leaves* flat, 3–8 in., flaccid, finely acuminate, sparsely hairy; ligule short. *Racemes* 4–12 in., erect; rachis strict, stout, smooth. *Spikes* $\frac{1}{2}$–$2\frac{1}{2}$ in., opposite alternate or whorled, sessile, green or pale yellow, shining, at first erect, at last deflexed. *Spikelets* closely imbricate, about $\frac{1}{6}$ in. long; gl. I and II with straight terminal awns.—*Dinebra verticillata,* Wight ex Steud. Syn. Gram. 209, is *Myriostachys Wightiana.*

92. LEPTOCHLOA, *Beauv.*

Annual grasses. *Leaves* flat or involute. *Spikelets* very minute, compressed, 1–many-fld., sessile or shortly pedicelled, alternate and unilateral on the very slender spike-like branches of a lax panicle, not jointed at the base; rachilla produced between the flg. gls., jointed at the base. *Glumes* 3–many, membranous; I and II unequal, oblong or lanceolate, 1-nerved; III and following broadly ovate, subacute or obtuse, 3-nerved, nerves usually hairy, 2 lateral near the margin; palea nearly as long as the gl., 2-keeled. *Lodicules* 2, cuneate. *Anthers* 3, short. *Styles* free. *Grain* subglobose oblong obovoid or 3-gonous, closely invested by the gl. and palea.—Species about 12, tropical and subtropical.

I have had great difficulty in disposing of the synonymy of this genus, the species of which are in a chaotic condition, and I regard the result here attained as tentative only, some of the synonyms adopted being little better than guesses, though the results of much study. The genus is absent in the Wallichian Herbarium of the Linnæan Society.

* *Leaves short, broad, membranous.*

1. **L. uniflora,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 409; spikelets 1-fld., gl. I and II linear-lanceolate, III ovate acuminate. *Trim. Cat. Ceyl. Pl.* 109. L. gracilis, *Wight ex Steud. Syn. Gram.* 213. Cynodon gracilis, *Nees ex Steud. l. c.*; *Thw. Enum. Pl. Ceyl.* 371; *Wight Cat.* n.

1752. Poa chinensis, *Burm. Fl. Ind.* 27, t. xi. f. 3 (*non Linn.*). Agrostis montana, *Herb. Rottler.*—Leptochloa, *Wall. Cat.* n. 8895.

TINNEVELLY; at Palamcotta, *Rottler.* CEYLON, dry parts of the island.—DISTRIB.—Trop. Afric.

Stem 1–2 ft., very slender, geniculately ascending from a creeping base. *Leaves* 1–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., elliptic-lanceolate, acute and apiculate, very thin, flaccid, base narrowed; ligule short, hyaline, lacerate. *Panicle* 6–8 in., very slender; spikes capillary, 2–3 in. *Spikelets* about $\frac{1}{16}$ in.; nerves of gl. III and palea fringed with long hairs. *Grain* not seen.—Judging from Burmann's figure of the leaf his *Poa chinensis* is, I think, *L. uniflora.*

** *Leaves long, narrow.*

2. **L. polystachya,** *Benth. Fl. Austral.* vii. 617 (*non Kunth*); panicle elongate contracted, spikes 1–1½ in. crowded erect, spikelets 1-fld. L. Neesii, *Benth. in Journ. Linn. Soc.* xix. (1881) 108; *Trim. Cat. Ceyl. Pl.* 109. Cynodon Neesii, *Thw. Enum. Ceyl. Pl.* 371. C. polystachyus, *Br. Prodr.* 187. C. virgatus, *Nees ex Wall. Cat.* n. 8894: *Wight Cat.* n. 1751; *Steud. Syn. Gram.* 213. Agrostis virgata, *Herb. Rottl. & Herb. Madr. ex Wall. l. c.*; A. chinensis, *Koen. ex Herb. Rottl.*

The Carnatic, *Rottler, Wight.* CEYLON; Trincomalee, *Glenie.*—DISTRIB. Australia.

Stems erect, 2–3 ft., stout or slender, sometimes proliferously branched below; lower nodes glabrous or bearded. *Leaves* 12–18 in., convolute, rarely flat, finely acuminate. *Panicle* 6–10 in., flexuous; branches filiform. *Spikelets* $\frac{1}{20}$ in., close-set, pale; gls. I and II unequal, ovate-lanceolate, rather longer than III, pale green; III broadly ovate, subacute, 3-nerved, nerves and keels of palea ciliate. *Grain* oblong, deeply grooved on one side.—The form of the panicle differs much from that of the following; but the spikelets and glumes are very much alike. *L. polystachya*, Kunth, an American plant, is a species of *Diplachne.*

3. **L. filiformis,** *Roem. & Sch. Syst.* ii. 580; spikes 2–3 in., spikelets 2–3-fld. *Kunth Enum. Pl.* i. 270, *Suppl.* 220; *Steud. Syn. Gram.* 209; *Wight Cat.* n. 1754; *Thw. Enum. Pl. Zeyl.* 271; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 192; *Aitchis. Cat. Panjab. Pl.* 167; *Miq. Fl. Ind. Bat.* iii. 389. E. chinensis, *Duthie Fodd. Grass. N. Ind.* 59, t. 71. ? E. filiformis, *Pers. Syn.* i. 87. Aira filiformis, *Roxb. Fl. Ind.* i. 326; *Herb. Ham. ex Wall. Cat.* n. 3804. Poa malabarica, *Klein ex Steud. Nom. Ed.* ii. 303, 60. P. chinensis, *Herb. Rottler.* P. contracta & panicea, *Retz. Obs.* iii. 11. P. virgata, *Roth. Nov. Sp.* 66; *Wight l. c.* Festuca tenuis & F.? Basnia, *Herb. Ham. ex Wall. Cat.* n. 3805 C. D.—Leptochloa, *Wall. Cat.* 3804, 3805.

Throughout INDIA and BURMA in the low country. CEYLON; Colombo, *Ferguson.*—DISTRIB. Trop. Asia, Africa and America.

Stem 1–2 ft., slender, geniculately ascending. *Leaves* 4–10 in., flat, flaccid, finely acuminate; ligule short. *Panicle* 4–8 in., contracted or diffuse, branches very many almost capillary; spikelets $\frac{1}{20}$ in., gl. I and II oblong-lanceolate, acute; III and IV broadly ovate, nerves and palea ciliate. *Grain* oblong, closely invested with the gl. and palea.—I have followed my predecessors in referring this Indian grass to *Leptochloa filiformis*, R. & S., though that plant is described as American, and as having glabrous flowers; a character apparently confirmed by Jacquin's drawing of its synonym *Eleusine filiformis*, Pers. (Jacq. Eclog. Gram. t. iv.) and by an observation of Loefl in Mart. Fl. Bras. ii. III. 93. On the other hand, I find the nerves of gl. III to be invariably hairy in American specimens corresponding with Jacquin's plate and the description of *L. filiformis*, and hence must suspect that this very inconspicuous character (except under a good magnifying power) has been overlooked.

Amongst other grasses referred to *filiformis*, but which from want of materials or descriptions or both I refrain from citing, is *L. tenerrima*, R. & S., which is described as having a 2-lobed tip of gl. III, a character which is approached only in *L. obtusiflora*, but which is easily produced in the very concave glume by a slight force in analyzing that organ. Bentham Fl. Hongk. and Fl. Austral. refers it to *L. chinensis*, to which its few (2–3-) fld. spikelets is opposed. It is probably a weak state of *L. filiformis*. With regard to *Aira filiformis*, Koen., in Roxb. Fl. Ind., Mr. Rendle informs me that there are in the British Museum a specimen so named by Koenig himself, and another authenticated by Roxburgh, and that both are the Indian *L. filiformis*. Roxburgh's characters of "leaves ensiform" and "calyx large" are therefore erroneous.

4. **L. chinensis,** *Nees in Syll. Ratisb.* i. (1824) 4, *Agrost. Bras.* 432; stem tall stout, spikes 2–4 in.; spikelets 4–6-fld., gl. iii. obtuse and apiculate. *Miq. Fl. Ind. Bat.* iii. 389 (*excl. Syn. Burm.*). *Steud. Syn. Gram.* 209; *Benth. Fl. Hongk.* 430, *Fl. Austral.* vii. 617; *Thw. Enum. Pl. Zeyl.* 371; *Trim. Cat. Ceyl. Pl.* 109; *Wall. Cat.* n. 8896; *Wight Cat.* n. 1755; *Duthie Grass. N.W. Ind.* 35 (*excl. syn.*), *Fodd. Grass. N. Ind.* 59, t. 71; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 372 (*excl. Syn.* tenerrima). E. decipiens & imbecilla, *Steud. l. c.* 279. Cynodon virgatus, *Nees in Wight Cat.* n. 1751. Poa as henes, *Roem. & Sch. Syst.* ii. 574. P. decipiens, *Br. Prodr.* 181. P. chinensis, *Linn. Sp. Pl.* 69 (*excl. Syn. Burm.*); *Roxb. Fl. Ind.* i. 332. P. malabarica, *Retz. Obs.* v. 19. P. secundaria, *Heyne in Herb. Rottl.*

Throughout INDIA and BURMA, in moist places. CEYLON, Atakalam Corle, *Thwaites.*—DISTRIB. China, Japan, Malaya, Australia.

Stem erect, or geniculately ascending, 2–4 ft., often as thick as a goose-quill. *Leaves* 6–18 in., flat or convolute, scaberulous; sheaths loose; ligule short, lacerate. *Panicle* 6–18 in.; branches opposite or alternate, suberect or spreading. *Spikelets* about $\frac{1}{10}$ in.; nerves of gl. III and keels of palea pilose. *Grain* loose, obtusely trigonous, subrugose.—A much more robust species than *L. filiformis*, but some of its forms are quite as slender as is that plant.

5. **L. obtusiflora,** *Hochst. in Flora*, xxxviii. (1835) 203; stem stout tall, panicle branches few erect, spikelets $\frac{1}{8}$ in. 6-fld., gl III oblong-ovate tip truncately rounded or retuse erose, grain obovoid triquetrous. *Steud. Syn. Gram.* 209. Poa maysorensis, *Rottler mss.*

SOUTHERN INDIA; Cochin, at Ayacotta, *Rottler.* (June 10th, 1808).—DISTRIB. Afr. trop.

Stem 2 ft. and upwards, erect, branched, leafy. *Leaves* narrow. *Panicle* of 9–12 simple erect branches 2–3 in. long. *Spikelets* alternate, sessile, as in *L. chinensis*, but larger with fl. glumes $\frac{1}{12}$ in. long, more oblong, with broad more or less truncate toothed tips, sometimes emarginate or retuse with an apiculus; keels of palea quite smooth. *Grain* larger than in *chinensis*, triquetrous, ventrally depressed.—Rottler's specimen is imperfect; he has labelled it "*Poae* species *malabaricæ* proxima, *P. maysorensis*, nob," and added the above description of the stem leaves and panicle, which exactly accord with African ones. It is very near *L. chinensis*, but of the great many plants of that species which I have examined none have the large spikelets and glumes of this. The habitat is an old fortified town near Cochin, that had great trade with Africa, whence the plant was probably introduced with merchandise.

DOUBTFUL INDIAN SPECIES.

L. CYNOSUROIDES, *Roem. & Sch. Syst.* ii. 579; *Kunth Enum. Pl.* i. 270; *Steud. Syn. Gram.* 208. L. filiformis, *Beauv. Agrost.* 71. Cynosurus filiformis, *Vahl Symb.* ii. 20. Chloris filiformis, *Poir. Encycl. Suppl.* ii. 238. Pollinia filiformis,

Spreng. Syst. Veg. i. 288; spike solitary, spikelets 3-fld.—Probably not a *Leptochloa.*

93. **DICHÆTARIA,** *Steud.*

A tall slender perennial grass. *Leaves* long, narrow, flat. *Spikelets* 1-fld. with the very long filiform gl. of a 2nd, sessile or shortly pedicelled, distantly scattered along a very long filiform rachis, very narrow, terete, not jointed at the base; rachilla not produced beyond gl. III, jointed at the base. *Glumes* 4, I and II unequal, empty, separately deciduous, narrowly lanceolate, acuminate or dorsally rounded, subaristate, entire or minutely 2-toothed below the tip, 3-nerved; III linear, terete, coriaceous, 3-nerved, tapering into a very long rigid recurved awn with two erect setæ at its base; IV, a filiform, awn-like, recurved glume, minutely 2-aristate above the middle; palea very narrow, 2-cuspidate, keels scaberulous. *Lodicules* large, obliquely cuneiform, fleshy. *Anthers* 3, very slender. *Styles* distinct, stigmas slender. *Grain* narrow.

D. Wightii, *Nees ex Steud. Syn. Gram.* 145. Gymnopogon rigidus, *Thw. Enum. Pl. Zeyl.* 372, 444; *Trim. Cat. Ceyl. Pl.* 109. Aristida linearifolia, *Rottl. mss.*—*Herb. Wight* n. 1035.

Southern India; Tranquebar, *Rottler*; probably Travancore, *Herb. Wight.* Ceylon, in dry parts of the island, *Thwaites.*

Stems, erect, 2–3 ft., tufted on a creeping woody rootstock. *Leaves* as long as the stem, $\frac{1}{6}$–$\frac{1}{3}$ in. broad, quite glabrous, margins smooth; ligule of hairs. *Panicle* 12–18 in., rachis and few short branches filiform, quite smooth. *Spikelets* with the awns 1½ in. long, green; gl. I shorter than II, which is about $\frac{1}{3}$ in. long and about $\frac{2}{3}$ as long as III below the short lateral bristles; rachilla below III bearded. —I think Steudel was right in separating this grass from *Gymnopogon*, all the species of which are American, and from which it differs totally in habit, and in the form of the spikelets, gl. III of which greatly exceeds I and II.

Tribe IX. Festucaceæ. (See p. 7.)

94. **POMMEREULLA,** *Linn. f.*

A short stout perennial creeping grass. *Leaves* short, strap-shaped. *Spikelets* 2–3-fld., distichously racemed, narrowly turbinate, villous, not jointed on their pedicels; rachilla stipitiform, narrowly obconic (resembling a callus), villous, jointed at the acute base, crowned by empty deformed fl. gls. *Glumes* 5–7, I and II narrow, persistent, empty; I lanceolate, 1-nerved; II longer, oblong-lanceolate, 3–5-nerved; III and IV embracing V and VI, empty, flabelliform, 4-lobed, dorsally shortly awned; V-VII flg. cuneate-obovate, 3-lobed; palea ovate, acute, nerves 2, pubescent. *Lodicules* 2, membranous. *Stamens* 2–3, anthers small. *Styles* distinct. *Grain* oblong, compressed, free.

P. Cornucopiæ, *Linn. fil. Diss. Nov. Gram.* 31, & *Suppl.* 105; *Vahl Enum. Pl.* ii. 393; *Beauv. Agrost.* 91, t. 18, f. 6; *Roxb. Pl. Corom.* ii. 17, t. 131, *Fl. Ind.* i. 331; *Roth. Nov. Sp.* 33; *Kunth in Ann. Sc. Nat. Ser.* I. xxiii. (1831) t. 7, *Enum. Pl.* i. 321; *Steud. Syn. Gram.* 249; *Trimen Cat. Ceyl. Pl.* 109; *Wall. Cat.* n. 8904; *Wight Cat.* n. 1769. P. elongatum, *Wight & Arn. in Wight Cat.* n. 1770. Pennisetum Cornucopiæ, *Heyne ex Wall. l. c.*

MYSORE and the CARNATIC, *Heyne, Wight.* CEYLON; Northern Province, *Trimen.*

Stem as thick as a crow-quill, rooting at the nodes; branches erect, stout, leafy, flattened. *Leaves* 1–3 in., distichous, flat, exactly linear, coriaceous, tip rounded, margins sparsely ciliate; sheath long or short, broad, flattened; ligule a ciliate ridge. *Raceme* ½–2 in., usually half sunk in the uppermost sheath, rarely with an exserted naked peduncle and sometimes 2 erect branches. *Spikelets* $\frac{1}{10}$–$\frac{1}{6}$ in., shortly pedicelled, white, tomentose, awns shortly exserted; gls. I and II much shorter than the spikelet, keels nearly smooth, bases narrowed; II inserted much above I, its base tightly embracing the rachilla; III and IV narrowed into a tomentose stipes, embracing V and VI, 4-lobed with a short dorsal awn, disk coriaceous, margins and lobes hyaline; V–VII cuneately obovate, 3-lobed.—A very curious grass. The turbinate spikelets resemble clusters of those of *Gracilea*, but are not jointed at the base, and their structure is totally different. The above characters are drawn from many analyses, but they will no doubt be found to vary in a more extended suite of specimens.

95. **PAPPOPHORUM**, *Nees.*

Perennial grasses. *Leaves* narrow. *Spikelets* 1–3-fld., in contracted or spiciform panicles, not jointed at the base; rachilla jointed at the base. *Gl.* I and II membranous, keeled, 3– many-nerved, persistent; III and IV much shorter (except the awns), coriaceous, orbicular, concave, obscurely many-nerved, cleft into 9 or more equal or alternately longer long-ciliate erect awns; IV and V usually imperfect; palea small, broad, 2-keeled. *Lodicules* 2, dolabriform. *Stamens* 3. *Sty'es* short, distinct; stigmas plumose. *Grain* ovoid or oblong, free.—Species about 20, in warm regions.

The synonymy of the species of this genus is in a most unsatisfactory condition; I am doubtful of the nomenclature of some here described, and the Indian materials of others, not here alluded to, are insufficient for reliable determination or descriptions.

1. **P. elegans,** *Nees in Wight Cat.* n. 1771; gl. I 9-nerved, II 7-nerved, awns of fl. gl. nearly equal about thrice as long as their gl. *Wall. Cat.* n. 8902; *Steud. Syn. Gram.* 199; *Duthie Grass. N.W Ind.* 35. Ischæmum papposum, *Herb. Rottler.* Enneapogon dipsaceus, *Wall. mss.* Calotheca elegans, *Wight & Arn. ex Steud. l. c.*

PESHAWUR, *Stewart.* SCIND, *Stocks.* MYSORE and the CARNATIC, *Heyne, Wight,* &c. BURMA, *Wallich,* &c.

Stem 3–18 in., very slender, wiry, erect or ascending from a woody often thickened base; nodes glabrous or tomentose. *Leaves* very narrow, flat or convolute; ligule a ridge of hairs. *Panicle* 1–3 in., branches very short and rachis villous. *Spikelets* with the awns $\frac{1}{6}$–$\frac{1}{4}$ in., sessile and pedicelled, softly tomentose, nearly white; gl. I and II oblong-lanceolate, acuminate, I ⅓ shorter than II; awns of III and IV ciliate below the middle; keels of palea pubescent.

2. **P. Aucheri,** *Jaub. & Spach Ill. Pl. Orient.* iv. 32, t. 323; gl. I and II 7-nerved, awns of flg. gls. three to four times as long as the gl. 4 much shorter than the others. *Steud. Syn. Gram.* 200; *Duthie Grass. N.W. Ind.* 35. P. turcomanicum, *Trautv. in Act. Hort. Petrop.* i. (1871) 27. P. persicum, *Steud. l.c.*; *Boiss. Fl. Orient.* v. 558; ? *Edgew. in Journ. Linn. Soc.* vi. (1862) 196; *Aitchis. Cat. Panjab. Pl.* 106. Enneapogon persicum, *Boiss. Diagn.* i. V. 71.

WESTERN PANJAB and MOOLTAN, *Aitchison, Stewart, Edgeworth,* &c. WESTERN TIBET, alt. 3–7600 ft., *Clarke, Duthie,* &c.—DISTRIB. Affghan., Persia, Turkestan.

Stem 6–12 in., erect or ascending, slender, puberulous. *Leaves* 2–8 in., narrow, flat or convolute and filiform; sheaths smooth, or lower tomentose; ligule a pubescent ridge. *Panicle* 2–5 in., cylindric, silvery-yellow, with sometimes purple awns; rachis pubescent. *Spikelets* including the awns, $\frac{1}{3}$–$\frac{1}{2}$ in. *Gls.* I and II narrowly lanceolate, finely pubescent; II rather the longest; III very short, villous, awns softly silky below the middle, the longer four times as long as the gl. and about $\frac{1}{4}$ longer than the intermediate; palea as in *P. elegans.*—I am doubtful about the identification of Edgeworth's Mooltan plant, of which the only specimens I have seen are very bad, consisting of tall very slender much branched rigid stems 12–18 in. high, with long very narrow rigid leaves, and a spiciform slender flowerless panicle 6 in. long, together with a spike of very immature spikelets. It is ticketed as from the Shah Kot Hills.

3. ? **P. brachystachyum,** *Jaub. & Spach Ill. Pl. Orient.* iv. 34, t. 324; dwarf, tomentose, spike very short, gl. I and II faintly 3–5-nerved below the middle, awns of fl. gl. about twice as long as their gl., 4 shortest. *Steud. Syn. Gram.* 200; *Boiss. Fl. Orient.* v. 558. ? P. arabicum, *Hochst. ex Steud. l. c.* 199; ? *Edgew. in Journ. Linn. Soc.* vi. (1862) 196; *Aitchis. Cat. Panjab Pl.* 166; *Duthie Grass. N.W. Ind.* 35. ? P. nanum, *Steud. l. c.*; *Edgew. l. c.*; *Aitchis. l. c.*; *Duthie l. c.* P. vincentianum, *Schmidt ex Duthie l. c.* (*in Syn.*)

The PANJAB; Multan, *Edgeworth.* RAJPOOTANA; at Jodhpur, *King.*—DISTRIB. Arabia, N. Africa.

I am very doubtful about this plant, King's specimens of which resemble a small state of *P. Aucheri,* with much shorter awns, the four shorter of which are not so short as in the figure cited of *P. brachystachyum.* Edgeworth's specimens of *P. arabicum* and *P. nanum* are insufficient for identification.

4. **P. robustum,** *Hook. f.*; stem stout, gls. I and II 3-nerved, awns of III nearly equal, about twice as long as their gls.

UPPER GANGETIC PLAIN; Hissar, *Drummond* (*Herb. Duthie*).

Stem 18 in.–3 ft., erect, or geniculately ascending, as thick as a crow-quill, pubescent; nodes tomentose. *Leaves* 6–10 by $\frac{1}{8}$–$\frac{1}{6}$ in., flat; lower sheaths pubescent; ligule a ridge of hairs. *Panicle* 2–5 in., silvery-grey, dense-fld., cylindric. *Spikelets* sessile, $\frac{1}{6}$ in. with the awns, villous; gl. I $\frac{1}{3}$ shorter than II, ovate-lanceolate; II lanceolate; III and palea as in *P. elegans,* but awns shorter, and as in that species with long cilia below the middle.

96. **ARUNDO,** *Linn.*

Tall stout perennial grasses. *Leaves* flat. *Spikelets* few-fld. in large decompound panicles, laterally compressed, fls. mostly bisexual; rachilla jointed at the base and between the flg. gls., glabrous or shortly hairy. *Glumes* 6 or more, I and II subequal, empty, narrow, acute or acuminate, glabrous, scarious, persistent, 3-nerved; flg. gls. lanceolate, acuminate, or 2-fid with a short awn, 3-nerved, dorsally hairy all over below the middle; palea hyaline, 2-nerved. *Lodicules* 2, obovate. *Stamens* 3. *Ovary* glabrous, styles distinct, stigmas plumose. *Grain* oblong.—Species 6 or 7, temp. and trop.

A. Donax, *Linn. Sp. Pl.* 81; stem creeping below, leaf-base amplexicaul, panicle erect thyrsiform, spikelets 3–4-fld., gls. I and II oblong-lanceolate 3-nerved, tip of flg. gls. minutely 2-toothed shortly awned.

Host Gram. Austr. iv. 22, t. 38; *Kunth Enum. Pl.* i. 246, *Suppl.* 159; *Reichb. Ic. Fl. Germ.* t. 109; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 36; *Ledeb. Fl. Ross.* iv. 394; *Boiss. Fl. Orient.* v. 564; *Aitchis. Cat. Panjab Pl.* 166; *Duthie Grass. N.W. Ind.* 35, *Fodd. Grass. N. Ind.* 60. A. bengalensis & bifaria, *Retz. Obs.* iv. 22, & v. 20; *Roxb. Fl. Ind.* i. 347, 348; *Kunth Enum. Pl.* i. 247. A. longifolia, *Salisb. Prodr.* 24. A. sativa, *Lamk. Fl. Fr.* iii. 616. A. triflora, *Roxb. Ic. Pict.* t. 853. Donax arundinaceus, *Beauv. Agrost.* 78, t. 16, f. 4. D. benghalensis, *Beauv. l. c.* 78. D. bifarius, *Trin. in Spreng. Neue Entdeck.* ii. 73. Amphidonax bengalensis, *Nees ex Steud. Syn. Gram.* 197; *Wight Cat.* n. 1748. A. bifaria, *Nees ex Steud. Syn. Gram.* 410; *Miq. Fl. Ind. Bat.* iv. 410. Scolochloa arundinacea, *Mert. & Koch Fl. Germ.* i. 529. Aira benghalensis, *Gmel. Syst.* i. 174.—Arundo, *Wall. Cat.* n. 5018, *excl. F.*, 5020.

Lower Himalaya; from Kashmir to Nepal, ascending to 3500 ft.; and from the Panjab to Silhet, the Naga Hills, alt. 5–8000 ft., and Burma. The Circars, Nilghiri, and Kurg Hills.—Distrib. Westward to Europe, N. Africa, N. Asia.

Stem 6–10 ft., fistular. *Leaves* 1–2 ft., tapering from the base to the apex, smooth, bifarious, drooping; ligule a ridge of hairs. *Panicle* 1–2 ft., branches scaberulous, erect or drooping. *Spikelets* $\frac{1}{3}$ in., green or yellowish; gls. I and II acute or obtuse and apiculate.—A curious branched small-leaved apparently dwarf form named *A. bambusifolia, mss.*, was collected by Griffith on the summit of Thumathaya (Mishmi Mts.), and is alluded to in his Journals, p. 45, as "an Arundo festucoidea." Grisebach (in Goett. Nachr. (1868) 76) describes a form of *A. Pliniana*, Turra, with the mouth of the sheath ciliate, as a native of the Himalaya (Simla, alt. 3–9000 ft.). The above character is found in Indian specimens of what I cannot distinguish from *A. Donax*. *A. Pliniana* appears to Dr. Stapf and myself to be a mere form of *Donax* with smaller spikelets, which organs in Indian specimens vary from $\frac{1}{4}$–$\frac{1}{3}$ in. The plants with the smaller spikelets are, I presume, the *A. mauritanica*, Poir. (a synonym of *Pliniana*) of *Duthie Grass. N.W. Ind.* 35, *Fodd. Grass. N. Ind.* 60.

97. **PHRAGMITES**, *Trin.*

Tall perennial grasses. *Leaves* long. *Spikelets* 3–7-fld. in decompound panicles, not jointed on the pedicels, laterally subcompressed; rachilla jointed between the flg. gls. and above gl. III, silkily penicillate with very long hairs, not produced beyond the fl. gls. *Glumes* all glabrous, I and II unequal, oblong-lanceolate, 3-nerved, membranous, persistent; III much longer, narrowly oblong-lanceolate, acute, 3-nerved, male or neuter, persistent; flg. gls. subulate-lanceolate, subaristate, hyaline; palea much shorter. *Lodicules* 2, obtuse. *Stamens* 1–3. *Styles* 2, terminal, free, stigmas plumose. *Grain* oblong, terete.—Species few, temp. and trop.

1. **P. communis,** *Trin. Fund. Agrost.* 134; stem 6–10 ft., and leaves withering in winter, leaf-margins rough, panicle 6–18 in. subsecund, inclined, branches not widely spreading, gl. III $\frac{1}{2}$–$\frac{3}{4}$ in. *Kunth Revis. Gram.* i. 277, t. 50; *Enum. Pl.* i. 251, *Suppl.* 193; *Fl. Dan.* t. 2664; *Reichb. Ic. Fl. Germ.* t. 108; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 37; *Steud. Syn. Gram.* 195; *Franch. & Sav. Enum. Pl. Japon.* ii. 170; *Boiss. Fl. Orient.* v. 563; *Benth. Fl. Austral.* vii. 636; *Duthie Grass. N.W. Ind.* 35, *Fodd. Grass. N. Ind.* 60. P. chilensis, *Steud. Nom. Ed.* II. ii. 234. ? P. Emodi, *Arn. & Nees in Nov. Act. Nat. Cur.* xix., *Suppl.* i. (1843) 174. P. hispanica, *Nees l. c.* P. humilis, *Not. in Cat. Hort. Genuen.* (1846) 27. P. longivalvis, *Steud. l. c.* 196. P. mauritanica, *Kunth Revis.* i. 80, 277, t. 50, *Enum.* i. 251.

P. pumila, *Griseb. in Goett. Nachr.* (1868) 76 (*an Willk.*?). P. vulgaris, *Trin. Fund. Agrost.* 134. Arundo graeca, *Link in Linnæa*, ix. (1834) 136. A. maxima, *Forsk. Fl. Æg. Arab.* 24. A. Phragmites, *Linn. Sp. Pl.* 81; *Host Gram. Austr.* iv. 23, t. 39; *Engl. Bot.* t. 401; *Knapp Gram. Britt.* t. 95; *Ledeb. Fl. Ross.* iv. 393; *Aitchis. Cat. Panjab Pl.* 266. ? A. tecta, *Blanc. Fl. Philipp.* 48. A. vulgaris, *Lamk. Fl. Franc.* iii. 615. Czernya arundinacea, *Presl Cyp. & Gram. Sicil.* 22.

KASHMIR LAKE, alt. 5–6000 ft., *Jacquemont*, &c. GARWHAL, alt. 4-5000 ft., *Duthie*. WESTERN TIBET, alt. 9–10,000 ft., *Thomson*, &c.—DISTRIB. N. and S. temp. regions.

Stem erect from a stout creeping rootstock, leafy up to the panicle, fistular. *Leaves* distichous, linear to broadly lanceolate, tip subulate, base rounded, not amplexicaul; ligule a ridge of short hairs. *Panicle* usually brownish purple; branches very slender, smooth, hairy; peduncle often silkily hairy at the very base of the panicle, sometimes densely. *Spikelets* $\frac{1}{2}$–$\frac{3}{4}$ in.; gls. spreading in frt. and exposing the long silky hairs of the rachilla, I and II longer than the flg.—Very variable; in dry situations in Tibet and Scind the stems are very short, straggling, with ovate-subulate concave rigid pungent leaves 1–2 in. long, and a reduced panicle. This starved state is the *Cenchrus frutescens*, Sieb. in Bot. Zeit. ix. (1822) 14. *P. pumila*, Griseb., is another reduced condition of *P. communis*, from Tibet, in which gl. III is as short as in *P. Karka*. Grisebach in Goett. Nachr. (1868) 76, has also var. *isiaca* (P. isiaca, *Reichb.*) as a native of Tibet. I have not seen his specimens, but neither Dr. Stapf nor I can find a valid character for this variety in European specimens.

2. **P. Karka,** *Trin. ex Steud. Nom. Ed.* ii. 324; stems very tall stout and leaves perennial, panicle $\frac{1}{2}$–2 ft. erect, branches widely spreading, gl. III rarely more than $\frac{1}{2}$ in. P. Roxburghii, *Steud. l. c.*; *Nees in Nov. Act. Nat. Cur.* xix., *Suppl.* i. (1843) 178; *Thwaites Enum. Pl. Zeyl.* 370; *Trim. Cat. Ceyl. Pl.* 109; *Benth. Fl. Hongk.* 428; *Duthie Grass. N.W. Ind.* i. 35, *Fodd. Grass. N. Ind.* 60; *Franch. & Sav. Enum. Pl. Jap.* ii. 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 378. P. bifaria, *Wight Herb.* n. 3310. P. nepalensis, *Nees ex Steud. Syn. Gram.* 196. Arundo Karka, *Retz. Obs.* iv. 21; *Roxb. Fl. Ind.* i. 348. A. Roxburghii, *Kunth Revis. Gram.* i. 79, *Enum. Pl.* i. 248; *Griff. Notul.* iii. 47, *Ic. Pl. Asiat.* t. 139, f. 243. A. Roxburghiana, *Kunth ex Steud. Nom. l. c.* A. tibialis, *Roxb. Ic. Pict.* (*ined.*), t. 854, *& in Wall. Cat.* n. 5017 G. A. Donax, *Herb. Ham. ex Wall. l. c.* B. A. Corea, *Herb. Rottl.* Oxyanthe japonica, *Steud. l. c.* 197. Sericura japonica, *Steud. in Flora*, xxix. (1846) 20. Trichoon Karka, *Roth. Catalect.* ii. 2.—Arundo, *Wall. Cat.* n. 5017, 5018 F., 5019.—Arundo, *Griff. l. c.* 48.

Throughout INDIA; from the Panjab to Burma, and southward to Ceylon, ascending the Himalaya in hot valleys to 3000 ft.—DISTRIB. Affghan., Japan, Trop. Asia, Africa, and Australia.

Except by its greater size, larger more spreading panicle with rather smaller spikelets, more spreading glumes, and shorter gl. III, I can point out no character whereby herbarium specimens of *P. Karka* can be distinguished from *P. communis*, and none of those are constant. In both dwarf or very slender states occur with almost filiform leaves and greatly reduced panicles. Dr. Stapf, who has carefully revised my separation of the great pile of Indian specimens into the two species, is equally at a loss to point out any other characters than those given above whereby to distinguish them, except that the rachilla appears to him to be rather longer and more slender in *P. Karka* and the glumes hence more widely apart; and the glumes also are rather narrower. The perennial duration of the stems and leaves of *P. Karka* requires verification. These organs are undoubtedly annual in the northern form of

P. communis, and F. Mueller observes (in a letter to Bentham) that they are so in the Tasmanian *P. communis*; whereas in the tropical Australian plant which Bentham includes under it they are evergreen.

Var. *cincta*; spikelets scaberulous, pedicels villous with silky hairs. *P. cincta*, *Clarke mss.*—Near Calcutta; Salt Lakes, *Kurz*; Mutlah, *Clarke*.—The specimens are in a very young state of flower. The glumes are identical with those of *P. Karka*, in which latter the pedicels of specimens from all parts of India are quite glabrous.

97*. **NEYRAUDIA,** *Hook. f.* (*Genus not in claris*).

A tall perennial leafy grass. *Leaves* long, flat. *Spikelets* small, 4–8-fld., in an effuse decompound nodding panicle, laterally compressed, lowest flg. gl. sometimes glabrous epaleate and neuter; rachilla shortly bearded below the flg. gls., jointed at the base (above the neuter gl. if present) and between the flg. gls. *Glumes* all membranous; I and II unequal, empty, lanceolate, 1-nerved; flg. gls. elongate-subulate, more or less recurved, ending in a very slender tip with 2 setaceous points and a scabrid interposed awn, 3-nerved, lateral nerves submarginal, penicillate with long hairs; palea oblong, keels scaberulous. *Lodicules* 2, obovate or cuneate. *Stamens* 3, anthers long linear. *Ovary* shortly stipitate, oblong; styles terminal, stigmas feathery. *Grain* linear, terete, loose in the gl.

N. madagascariensis, *Hook. f.*; Arundo madagascariensis, *Kunth Revis. Gram.* i. 273, t. 48, *Enum.* i. 247, *Suppl.* 190; *Benth. Fl. Hongk.* 427; *Duthie Grass. N.W. Ind.* 35 (*excl. Syn.*), *Fodd. Grass. N. Ind.* 60. A. Reynaudiana, *Kunth Revis. l. c.* 275, t. 49, *Enum. l. c.*; *Steud. Syn. Gram.* 194; *Clarke in Journ. Linn. Soc.* xxv. (1889) 89. A. Zollingeri, *Buese in Miq. Pl. Jungh.* 243; *Miq. Fl. Ind. Bat.* iii. 411. Phragmites Zollingeri, *Steud. in Zoll. Cat.* 55; *Syn. Gram.* 196. Donax Thouarii, *Beauv. Agrost.* 78, t. 16, f. 5.—Arundinacea, *Griff. Notul.* iii. 49, n. 6; *Ic. Pl. Asiat.* t. 156, f. II.—Arundo, *Wall. Cat.* n. 5021, 5022.

The PANJAB and TROPICAL HIMALAYA, from Chamba to Sikkim, ascending to 5000 ft. SILHET and the KHASIA HILLS, ASSAM, PENANG and BURMA.—DISTRIB Tropical E. Asia and Malaya. Trop. Africa, Madagascar.

Stem 6–8 ft. (or more?) up to ½ in. diam., leafy to the panicle or near it, polished, solid, glaucous at the nodes. *Leaves* 1–2 ft., from filiform and convolute to 1 in. broad and flat, smooth, rather soft, margins smooth or nearly so, midrib and few nerves slender, base subamplexicaul; sheaths polished; ligule a villous ridge. *Panicle* 1–3 ft., rachis and filiform fascicled and whorled branches smooth or subscaberulous, ultimate branchlets capillary. *Spikelets* ¼–⅓ in. (including the awns), shortly pedicelled, pale brown, 4–8 fld.; gl. I and II shining, I ⅓ shorter than II; neuter gl. if present ⅛–⅕ in., about twice as long as I, strict, spreading, oblong-lanceolate, suberect, 3-nerved, sides convolute, quite glabrous; flg. gls. longer than the empty, more or less recurved, very slender, narrowed into the more or less recurved not twisted scaberulous awn with two bristles at its base; palea hyaline, 2-toothed, keels minutely ciliolate; callus, the upper portion of each internode of the rachilla, jointed with the latter, densely shortly bearded.—A much more elegant grass than any Indian species of *Arundo* or *Phragmites*, but like these extremely variable in habit and size, depending on place of growth. I can find no difference whatsoever between the specimens with and those without the empty gl. III; specimens with filiform leaves occur in both. Their habitats are as follows:—

1. *madagascariensis* proper; neuter gl. 0. Western Himalaya; from Kashmir to Kumaon, Rangoon, Prome.—Africa, Madagascar.

2. *Zollingeri*; neuter gl. present. Arundo Reynaudiana, *Kunth l. c.*—Sikkim Himalaya, Assam, Bengal, the Khasia Hills, Chittagong, Tenasserim, Penang.—Java.

98. **FINGERHUTHIA,** *Lehm.*

Erect, rigid, annual or perennial grasses, with the habit of *Phleum*. *Leaves* narrow. *Spikelets* crowded in a spiciform panicle, 1–3-fld., lowest in the panicle reduced to subulate glumes, laterally compressed, jointed on the very short pedicels; lower fl. bisexual or male, upper if present male, uppermost an empty gl. *Glumes* I and II subequal, rigidly membranous, keeled, 1-nerved, awned; III as long as II, oblong-lanceolate, obtuse, 5-nerved, mucronate or dorsally shortly awned; palea rigid, 2-keeled. *Lodicules* 2, obcordate. *Anthers* 3, linear-oblong. *Styles* long, free, stigmas plumose. *Grain* elliptic or oblong, free.—Species 2, a S. African, and the following.

A genus of doubtful affinity, with certain characters of *Alopecurus*, and of *Melica* in the spikelets jointed on their pedicels; the imperfect basal spikelets form a sort of involucre to the spiciform panicles as in *Sesleria*.

F. affghanica, *Boiss. Fl. Orient.* v. 569; spikelets 3-fld., lowest fl. fem., intermediate male, upper neuter, gls. I and II shortly awned keels and margins ciliate. F. Africana, *Aitchis. in Journ. Linn. Soc.* xix. (1882) 193 (*non Lehm.*).

Western Panjab; Peshawur, alt. 3500 ft., *Stewart.*—Distrib. Affghan.

Stem 12–18 in., tufted, slender, leafy. *Leaves* very narrow, flat, glaucous, glabrous, smooth; sheath glabrous, mouth bearded; ligule a ridge of soft hairs. *Spike* ¾–1 in., oblong, obtuse, long-peduncled, pale green. *Spikelets* ⅕ in., closely imbricate; gls. I and II lanceolate, narrowed into straight awns as long as themselves, keels and margins ciliate with long hairs; III chartaceous, mucronate, keel smooth, margins ciliate; keels of palea ciliate; IV hardly awned; V an empty gl. *Grain* elliptic-oblong, acute at both ends.—The only Indian specimen is a very poor one.

99. **ELYTROPHORUS,** *Beauv.*

An annual erect grass. *Leaves* narrow, flat. *Spikelets* very minute, 3–5-fld., in globose sessile clusters that are densely packed along a simple rachis forming a long cylindric often lobed or interrupted spike: each cluster consists of very many densely crowded sessile compressed spikelets with awned glumes subtended by many empty glumes, not jointed at the base; rachilla smooth, jointed at the base and between the flg. gls. *Glumes* (of perfect spikelets), I and II subequal, empty, membranous, mucronate, keeled, 1-nerved, persistent; flg. gls. rather larger, narrowed into short awns, 3-nerved, uppermost empty; palea complicate, one or both keels winged. *Lodicules* 2, obliquely oblong. *Anthers* 1–3, minute. *Styles* free, stigmas long hairy. *Grain* obliquely oblong, beaked, free.

E. articulatus, *Beauv. Agrost.* 67, t. 14, f. 2; *Kunth Revis. Gram.* ii. 481, t. 154, *Enum. Pl.* i. 391, *Suppl.* 325; *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Ceyl. Pl.* 189; *Aitchis. Cat. Panjab Pl.* 171; *Wall. Cat.* n. 3825; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61, t. 72; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 379; *Miquel Fl. Ind. Bat.* iii. 400; *Benth. Fl. Austral.* vii. 638. Echinalysium articulatum & strictum, *Trin. Fund. Agrost.* 142. Dactylis spicata, *Willd. in Ges. Naturf. N. Schrift.* iii. (1801) 416. Sesleria spicata, *Spreng. Pugill.* ii. 21. Eleusine calycina, *Herb. Ham. ex Wall. l. c.*

From the SUTLEJ to BENGAL, ASSAM, the DECCAN PENINSULA, BURMA, and CEYLON.—DISTRIB. Trop. Asia, Africa, and Australia.

Whole plant 6–18 in. high, strict, glabrous; flowering part often longer than the rest. *Leaves* as long as the stem and spikes or shorter, very narrow; sheath loose; ligule obscure. *Spiciform panicle* 2–8 in. by $\frac{1}{6}$–$\frac{1}{3}$ in. diam., pale green or white, rarely branched below. *Spikelets* $\frac{1}{6}$ in., empty gls. ciliate, hyaline, nerve green; flg. gls. ovate, membranous, tips and awns scaberulous; palea hyaline, 2-fid.

100. **LAMARKIA,** *Moench.*

A small annual tufted grass. *Leaves* flat. *Spikelets* dimorphic, fertile and neuter, crowded on the drooping branches of a simple secund nodding panicle, terminal spikelet of each branchlet fertile of few gls. surrounded by empty gls., and by neuter spikelets of many obovate convolute erose gls. *Fertile spikelet*; glumes IV, I and II membranous, subequal, subulate-lanceolate, 1-nerved, subaristate, persistent; III shorter, ovate, convolute, dorsally awned below the 2-fid tip; IV terminating the slender rachilla, neuter, long-awned; palea of III narrow, 2-fid, 2-keeled. *Lodicules* very minute. *Stamens* 3, anthers linear. *Styles* distinct, stigmas slender, hairy. *Grain* elliptic-oblong, closely wrapped in the gls. and palea.

L. aurea, *Moench Meth.* 201; *Kunth Enum. Pl.* i. 389, *Suppl.* 324; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 77; *Boiss. Fl. Orient.* v. 570; *Aitchis. Cat. Panjab Pl.* 170; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61. L. Hookeriana, *Griff. Notul.* iii. 94, *Ic. Pl. Asiat.* t. 143, f. 2. Chrysurus aureus, *Beauv. Agrost.* 123, t. 22, f. 5; *Reichb. Ic. Fl. Germ.* t. 58. C. cynosuroides, *Pers. Syn.* i. 80. Pterium elegans, *Desv. Journ. Bot.* i. (1813) 76. Tinæa elegans, *Garzia Rel. Acc. Zel. Aci.-Reale, Ann.* 3–4, 24, *ex Parlat. Fl. Palerm.* i. 138. Cynosurus aureus, *Linn. Sp. Pl.* 73; *Host Gram. Austr.* iii. t. 4; *Sibth. Fl. Græc.* i. t. 79.—Gramin. *Griff. Itin. Notes,* 349, n. 106.

WESTERN PANJAB; Peshawar, *Vicary, Stewart, Aitchison.*—DISTRIB. Westwd. to Spain and the Canaries.

Stem 4–8 in., stout or slender, leafy. *Leaves* broadly linear, acuminate; ligule oblong. *Panicle* 1-4 in., golden-yellow, shining; branches crowded, $\frac{1}{4}$–$\frac{1}{2}$ in. long, covered with fascicles of pendulous scaberulous spikelets. *Flowering spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in.; awns variable in length, $\frac{1}{3}$–$\frac{1}{4}$ in.—A very beautiful grass.

101. **CYNOSURUS,** *Linn.*

Annual or perennial tufted grasses. *Leaves* flat. *Spikelets* dimorphic, fascicled, fascicles collected in a dense unilateral spiciform terminal panicle, the 1–2 terminal of each fascicle 2–3-fld., the lower 1–2 of many neuter distichous pectinately spreading subulate glumes, persistent on an unjointed rachilla. *Glumes* of fertile spikelet 4–5; I and II narrow, acute or subaristate, 1-nerved; III and IV awned or mucronate, 1–3-nerved, uppermost imperfect; palea narrow, 2-toothed, keels ciliate. *Lodicules* 2, acuminate. *Stamens* 3. *Styles* short, free. *Grain* elliptic or oblong, glabrous, adherent to the gl. and palea.—Species 3–4, in N. temp. regions.

C. cristatus, *Linn. Sp. Pl.* 72; perennial, fertile spikelets 3–5-fld. *Fl. Dan.* t. 238; *Host Gram. Austr.* ii. t. 96; *Kunth Enum. Pl.* i. 388,

Suppl. 323; *Engl. Bot.* t. 316; *Knapp Gram. Britt.* t. 64; *Reichb. Ic. Fl. Germ.* t. 7; *T. Nees Fl. Germ. Monocot.* i. n. 96; *Beauv. Agrost.* 66; *Steud. Syn. Gram.* 299; *Ledeb. Fl. Ross.* iv. 348; *Boiss. Fl. Orient.* v. 570; *Duthie Grass. N.W. Ind.* 36.

Western Himalaya; Drankar, in Piti, alt. 12–14,000 ft., *Stolizka* (introd.?) —Distrib. Europe, As. Min. (introd. elsewhere).

Perennial. *Stem* 1-2 ft., slender, simple, wiry, strict, stoloniferous, naked above. *Leaves* very narrow, slightly hairy; ligule 2-fid. *Panicle* 1–3 in., semicylindric, strict, rigid, oblong or linear; rachis flexuous. *Spikelets* about $\frac{1}{12}$ in., the outer pectinately arranged, forming an involucre to each fascicle; flg. glumes I and II oblong, scabrid above, very shortly awned; neuter gls. rigid, cuspidate, concave, scabrid, pungent.—I have seen no Indian specimen of this common European grass. According to Boissier its Eastern limit is the Caucasus.

102. **KOELERIA,** *Pers.*

Annual or perennial tufted grasses. *Leaves* narrow. *Spikelets* 2–7-fld. (uppermost flg. sterile), densely crowded in subspiciform panicles, strongly laterally compressed, very shortly pedicelled; rachilla jointed between the fl. gls., and produced beyond the upper. *Glumes* I and II unequal, empty, persistent, keeled, acute or acuminate; fll. gls. broadly scarious, 3–5-nerved, mucronate acuminate or bifid and shortly awned in the sinus; awn straight scabrid; palea hyaline, 2-toothed. *Lodicules* 2. *Stamens* 3. *Stigmas* subsessile, plumose. *Grain* oblong, laterally compressed, free.—Species about 12, of N. temp. regions.

Sect. I. Airochloa, *Link.* (Gen.). Perennial. *Flg. glumes* entire, not awned.

1. **K. cristata,** *Pers. Syn.* i. 97; leaves short, panicle shining, spikelets 2–4-fld. I 1-nerved, II longest, 1–3 nerved; flg. gls. acute or mucronate. *Fl. Dan.* t. 2223; *Kunth Enum. Pl.* i. 381, *Suppl.* 315; *Reichb. Ic. Fl. Germ.* t. 93; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 64; *Steud. Syn. Gram.* 292; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61; *Aitchis. Cat. Panjab Pl.* 170; *Ledeb. Fl. Ross.* iv. 402; *Boiss. Fl. Orient.* v. 571; *Benth. Fl. Austral.* vii. 639. K. glauca. *DC. Cat. Hort. Monsp.* p. 117; *Ledeb. l. c.* K. gracilis, *Pers. l. c.* K. Linkii, *Kunth l. c.* K. lobata, *Roem. & Sch. Syst.* ii. 620. K. nitida, *Nutt. Gen. Am.* i. 74. K. valesiaca, *Gaud. in Alpina* iii. 47, *Agrost.* i. 149. Aira cristata, *Linn. Sp. Pl.* 63; *Engl. Bot.* t. 648; *Knapp Gram. Britt.* t. 30. A. glauca, *Spreng. Nachtr. Bot. Gart. Halle,* i. 10; *Fl. Dan.* t. 1566; *Kunth l. c.* i. 381. Airochloa cristata, valesiaca, pubescens, & gracilis, *Link Enum. Hort. Berol.* i. 127, 128, ii. 228. Dactylis cristata & lobata, *Bieb. Fl. Taur. Cauc.* i. 67. D. paleacea, *Linn. Herb. ex Munro in Journ. Linn. Soc.* vi. (1862) 44. Poa cristata, *Withering Arr. Brit. Pl.* 145; *Host Gram. Austr.* ii. 54, t. 75. P. nitida & pyramidata, *Lamk. Illustr.* i. 182, 183. Festuca cristata, *Vill. Hist. Pl. Dauph.* ii. 93. F. dactyloides, & F. glaucescens, *Roth. Nov. Sp.* 78.

Temperate and Alpine Himalaya, and Western Tibet; from Kashmir to Nepal, alt. 5–13,000 ft.—Distrib. N. temp regions.

Densely tufted, stoloniferous. *Stem* 1–3 ft., slender, glabrous or pubescent. *Leaves* narrow, flat or involute, glabrous or the lower ciliate; old sheaths not lacerate; ligule obscure. *Panicle* 1–4 in., linear-oblong or lanceolate; branches very short, scabrid; peduncle glabrous or tomentose. *Spikelets* $\frac{1}{8}$–$\frac{1}{5}$ in., shining, green,

purplish, or silvery with a green keel; gls. I and II acute, broadly hyaline, glabrous pubescent or scabrid, keel subscaberulous, rachilla scabrid; flg. gls. lanceolate, acute or submucronate.—The synonymy given above includes but a few of the names given to this variable grass, the determination of the species of which would involve great labour. In India there are two prevalent forms, both common European ones, which following Boissier may be thus defined.

Var. *tenuifolia*, Boiss. Fl. Orient. v. 575; stems 6–10 in., leaves very short narrow convolute, panicle 1–3 in., spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. green or purplish. K. brevis, *Ster. in Bull. Soc. Nat. Mosc.* xxx. (1857) II 110.—Koeleria, *Wall. Cat.* n. 3792.—Subalpine and alpine situations, alt. 9–13,000 ft.

Var. *grandiflora*, Boiss. l. c.; leaves longer broader flat, panicles 3–5 in. white often interrupted or branched below, spikelets $\frac{1}{5}$ in. K. glauca, *Ledeb. Fl. Ross.* iv. 402. K. grandiflora, *Bertol. ex Schult. Mant.* ii. 345.—Temp. regions, alt. 5500–11,000 ft.

Sect. II. LOPHOCOLEA, *Reichb.* (Gen.). Annual. *Flg. glumes* 2-fid, awned.

2. **K. phleoides,** *Pers. Syn.* i. 97: leaves soft flat glabrous or hairy on the margins and towards the base, panicle cylindric pale or dull green lobulate or not, spikelets 3–7-fld., gl. I and II unequal acute or aristately acuminate glabrous pubescent or hirsute, flg. gls. 2-fid awned in the sinus, awn $\frac{1}{4}$–$\frac{1}{2}$ as long as the gl. rarely longer. *Kunth Enum. Pl.* i. 383, *Suppl.* 317, t. 28, f. 1; *Steud. Syn. Gram.* 294; *Ledeb. Fl. Ross.* iv. 403; *Boiss. Fl. Orient.* v. 572; *Duthie Grass. N.W. Ind.* 36, *Fodd. Grass. N. Ind.* 61; *Aitchis. Cat. Panjab. Pl.* 170; *Benth. Fl. Austral.* vii. 639. K. berythea, *Boiss. & Bl. Diagn. Ser.* II. iv. 135. K. brachystachya, *DC. Cat. Hort. Monsp.* 120. K. cristata, *Bertol. Amoen. Ital.* 67. K. dactyloides, *Spreng. Syst.* 332. K. Figarei, *de Notar. in Ann. Sc. Nat. Ser.* III. ix. (1848) 325. K. obtusiflora, *Boiss. l. c.* I. vii. 131. K. trapezuntina, *C. Koch in Linnæa*, xxi. (1848) 396. Festuca cristata, *Linn. Sp. Pl.* 76. F. phleoides, *Vill. Fl. Delph.* 7, *Hist. Pl. Delph.* ii. 95. t. 2; *Host Gram. Austr.* iii. t. 21. Lophochloa phleoides, *Reichb. Fl. Germ. Excurs.* 42, *Ic. Fl. Germ.* 73; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 63. Wilhelmsia caucasica, *C. Koch in Linnæa*, xxi. (1848) 400. Dactylis caudata, & cylindracea, *Brot. Fl. Lusit.* i. 99, 100. D. pungens, *Hornem. Enum. Hort. Hafn. ex Kunth* (1804) 9. D. spicata, *Brot. ex Spreng. Syst.* i. 332. Trisetum phleoides, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 65. Poa phleoides, *Lamk. Illustr.* i. 182. Bromus alopecuroides, *Lagasc. Gen. & Sp. Nov.* 4. B. dactyloides, *Roth Nov. Sp.* 60. Rostraria pubescens, *Trin. Fund. Agrost.* 149.

PLAINS of the PANJAB, from Lahore westwards. The SALT RANGE, &c. KASHMIR, *Clarke.*—DISTRIB. Westwd. to the Atlantic. (Australia, introd.)

Stems 6–12 in., erect or ascending. *Leaves* as long or shorter, erect, acuminate; sheaths smooth; ligule short, truncate. *Panicle* $\frac{1}{2}$–3 in., by $\frac{1}{4}$–$\frac{1}{3}$ in. diam., sometimes lobed or branched at the base. *Spikelets* $\frac{1}{8}$–$\frac{1}{6}$ in., hardy shining, gls. I and II unequal, shorter than the flg., keels scabrid or smooth; I oblong-lanceolate, 1-nerved; II longer, oblong, acuminate, 3-nerved; flg. gls. elliptic-oblong, 5-nerved, at length tubercled, awn short or long, rachilla hairy.—A variable plant in the glumes, of which Boissier has 4 varieties. As with *K. cristata*, I have confined the synonyms of *K. phleoides* to those I am pretty sure of. Probably a dozen others might be cited.

3. **K. argentea,** *Griseb. in Goett. Nachr.* (1868) 77; leaves flat glabrous, panicle interrupted elongate, spikelets 2–3-fld. silvery white

glabrous shining, tip of gl. I 2-toothed, awn of flg. gl. very short dorsal above the middle of the gl.

WESTERN TIBET, and Kishtwar, alt. 10–13,000 ft., *Falconer*, *Thomson*, &c.

Stem 12–18 in., tufted, tomentose below the panicle. *Leaves* 3–5 in., very narrow, glabrous, flat or convolute; ligule short, lacerate. *Panicle* 1½–3½ in., rachis tomentose. *Spikelets* ⅛ in., shining, gls. I and II subequal or I rather the shortest, both 1-nerved; rachilla laxly villous; awn of flg. gls. a little exceeding the gl. itself.

103. **CATABROSA,** *Beauv.* (by O. Stapf).

Perennial soft grasses; stem erect or creeping below; innovations extra-vaginal. *Leaves* flat. *Spikelets* very small, 2- (rarely 3–4)- fld., loosely panicled, oblong or obconic, awnless, subarticulate on their pedicels; rachilla jointed at the base, produced beyond the flg. gl. *Glumes* 4 or more, uppermost usually imperfect; I and II very unequal, hyaline, empty, persistent, 0–3-nerved; I obtuse or truncate; II broadly obcuneate or orbicular; III and IV longer than II, broadly cuneate or flabelliform, 3–5-nerved, truncate, crenate; palea as long as the gl., very broad, keels smooth, glabrous or hairy. *Lodicules* 2, minute, fleshy. *Stamens* 3. *Stigmas* subsessile, feathery. *Grain* obovate or oblong, free, glabrous.—Species 10–12, natives of cold or temperate regions.

Under *Phippsia* (p. 240), I indicated the affinity of that genus with *Colpodium*, and a further examination of the Indian plants referred to the latter, suggested to me the possibility of these, together with *Dupontia*, forming one genus. I accordingly drew Dr. Stapf's attention to the group, and requested him to give me his opinion. This he has done, confirming my hypothesis and drawing up a systematic account of the Indian species to be included under *Catabrosa*. As to *Phippsia algida*, the solitary arctic type of that genus, it differs from the other plants of the *Colpodium* group in the empty gls. being minute or obsolete, and may hence be considered as forming a section by itself, whilst *P. himalaica*, with larger empty gls., enters that of *Colpodium*. The position of *Catabrosa* is after *Poa*, replacing 119. *Colpodium* in the Key to the Genera.

§ 1. CATABROSA proper. Empty gls. almost nerveless; flg. gls. strongly 3-nerved, rarely with 2 intermediate fainter nerves.—Aquatic or subaquatic plants, rooting at the lower nodes, and with usually long creeping or ascending branched stolons.

1. **C. aquatica,** *Beauv. Agrost.* 97, t. 19, f. 8; stem compressed, leaves linear obtuse, panicle oblong or pyramidal, lower branches at length deflexed, spikelets 2 rarely 3-fld., gl. III erose, nerves subpercurrent. *Kunth Enum. Pl.* i. 369, *Suppl.* 306, t. 25, f. 1; *Ledeb. Fl. Ross.* iv. 387; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 58; *Boiss. Fl. Orient.* v. 576. ? C. frigida, *Phil. Fl. Atac.* 55. C. ochroleuca, *Guss. Fl. Sic. Syn.* i. 100; *Dumort. Obs. Gram. Belg.* 108. Aira aquatica, *Linn. Sp. Pl.* 64; *Fl. Dan.* t. 381; *Host Gram. Austr.* ii. t. 41; *Engl. Bot.* t. 1557; *Knapp. Gram. Britt.* t. 29. Colpodium aquaticum, *Trin. Fund. Agrost.* 136. Glyceria airoides, *Reichb. in Moessl. Handb. Ed.* II. iii. 1827, *Ic. Fl. Germ.* t. 78. G. aquatica, *J. & C. Presl. Fl. Cech.* 25 (*non Wahlb.*); *Steud. Syn. Gram.* 286. Molinia aquatica, *Wibel Prim. Fl. Werth.* 116. Poa airoides, *Koel Descr. Gram.* 194.

BRITISH BELUCHISTAN; Quetta (*Duthie*).—DISTRIB. N. Temp. and Arctic regions.

Stem 6–24 in., erect from the creeping sometimes floating base, sheathed nearly up to the panicle; stolons creeping or ascending, branches long or short. *Leaves* 1–6 by $\frac{1}{6}$–$\frac{1}{3}$ in., linear, obtuse, flat, subflaccid, smooth; sheaths tight, smooth, of young branches closed to near the mouth but easily split to the base; ligule ovate or truncate, hyaline. *Panicle* up to 8 in., open, loose, rachis smooth, lower branches 5–10-nate, slender, very unequal, subscaberulous, the longer 4 in., branching; lateral pedicels very short. *Spikelets* pale green or yellowish, rarely purple; rachilla smooth; gls. very thin broad and obtuse; I about $\frac{1}{3}$ in., nerveless or 1-nerved; II $\frac{1}{6}$ in., 1- sub-3-nerved; fl. gls. nearly $\frac{1}{10}$ in., obovate to broadly oblong, truncate, shortly hairy below; palea broad, very obtuse, keels hairy below. *Lodicules* obliquely ovate. *Anthers* $\frac{1}{20}$ in. *Grain* $\frac{1}{20}$ in., oblong, subacute at both ends or top rounded, laterally subcompressed, hilum punctiform.—I have seen no Indian specimens, but am informed by Mr. Duthie that his was named by Hackel.

Var. *augusta*, Stapf; dwarf, tufted, with or without stolons, panicle narrow contracted, branches very short, gls. I and II nerveless or nearly so, flg. gls. $\frac{1}{15}$–$\frac{1}{14}$ in. C. aquatica, *Duthie Grass. N.W. Ind.* 36.—Western Tibet; Lanak Pass, alt. 15–16,000 ft., *Thomson.*

2. **C. sikkimensis,** *Stapf*; stem short, stolons long, leaves $\frac{1}{2}$–1 in., panicle $1\frac{1}{2}$ in. narrow loose, branches 2-nate subsimple, spikelets $\frac{1}{10}$ in. 2-fld., gl. I minute, flg. gls. 5-nerved, nerves ending below the hyaline margin, lateral rather strong.

ALPINE SIKKIM; alt. 17,000 ft., *Gammie.*

Stem up to 6 in., prostrate or ascending; sto'ons with short fascicles of few short complicate leaves. *Spikelets* dark purple, variegated with yellow; gl. I up to $\frac{1}{50}$ in. nerveless, broadly ovate to oblong, II up to $\frac{1}{20}$ in., broader, sub-1-nerved; flg. gls. $\frac{1}{14}$ in., truncate, erose, glabrous; palea broad, very obtuse, keels smooth.—The specimens are very scanty, and have all the appearance of being reduced forms, growing on wet soil on the upper limits of vegetation. Specimens from a lower altitude may require modification of the above characters.

§ 2. COLPODIUM, *Trin.* (Gen.). Empty gls. 1–3-nerved; flg. gls. 5–3-nerved, nerves faint, lateral short, intermediate often suppressed or represented by a single spiral vessel.

* *Empty gls. about half as long as the flg.*

3. **C. himalaica,** *Stapf*; panicle erect spiciform dense-fld., spikelets $\frac{1}{10}$–$\frac{1}{6}$ in. 1–2-fld. Colpodium subspicatum, *Hack. mss.* Phippsia himalaica, *Hook. f. ante*, p. 240. Vilfa, sp. 2, *Herb. Strachey & Winterb.*

From Kashmir to Kumaon, alt. 13–14,500 ft.

Stems 3–8 in., tufted, erect, smooth, nodes 1–2. *Leaves* complicate or the cauline flat; sheaths tight, closed almost to the mouth; ligule very short. *Panicle* continuous or interrupted; rachis and branches smooth. *Spikelets* obovoid to oblong, rachilla glabrous; gls. very thin, nerves obscure; I very shortly 1-nerved; II with short obscure side-nerves; III with very short obscure side-nerves, keel and nerves shortly hairy; keels of palea ciliate. *Lodicules* connate at the base. *Grain* elliptic-oblong, compressed.—For further description see p. 240. Duthie's n. 12,160 has more acute empty glumes with sometimes erose margins, but does not otherwise differ.

4. **C. Thomsoni,** *Hook. f.*; panicle erect open lax-fld., spikelets $\frac{1}{8}$–$\frac{1}{6}$ in. 2–4-fld.

WESTERN TIBET; Nubra Valley, alt. 10–11,000 ft., *Thomson.*

Stems 4–6 in., tufted, very slender, erect, smooth, nodes 3–5. *Leaves* $\frac{1}{2}$–$1\frac{3}{4}$ in., linear, acute, flat, few-nerved; sheaths closed to $\frac{1}{10}$–$\frac{1}{5}$ in. of the mouth, thin, tight;

ligule broadly ovate, rounded. *Panicle* 1 in., ovate, erect; rachis smooth; branches spreading or deflexed, filiform, with few spikelets; lateral pedicels very short. *Spikelets* oblong, pale green; rachilla smooth, tip setiform; gls. thin, obtuse, I 1-nerved; II longer with 2 short lateral nerves; III 5-nerved, lateral nerves very faint and keel hairy; palea 2-fid, keels with long hairs. *Anthers* oblong. *Lodicules* connate near the base. *Grain* obliquely oblong, compressed.

5. **C. nutans,** *Stapf*; panicle open or contracted flaccid, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. 2–5-fld. Colpodium nutans, *Griseb. in Goett. Nachr.* (1868) 76. Graphaphorum nutans, *Munro ex Duthie Grass. N. W. Ind.* 41.

Alpine Himalaya; from Kashmir to Garwhal, alt. 10–14,000 ft., *Jacquemont*, &c.

Stems 12–18 in., tufted, erect, smooth, nodes 2–3. *Leaves* very variable in length and breadth, up to 6 in. by $\frac{1}{3}$ in., flat flaccid, many-nerved; sheaths of innovations closed nearly to the mouth; ligule $\frac{1}{4}$ in. *Panicle* 2–5 in., nodding or flexuous; rachis smooth; branches subcapillary, lowest 2–3-nate, sparingly divided beyond the middle; lateral pedicels half as long or as long as the spikelets. *Spikelets* broadly obovate, variegated, rachilla glabrous; gls. very broad, thin, obtuse and erose; I 1–3-nerved, II longer, $\frac{1}{10}$ in., with 2 short lateral nerves; III obovate, 3–5-nerved, lateral nerves very short, all hairy; keels of palea hairy. *Lodicules* lanceolate, connate near the base. *Anthers* linear. *Grain* oblong, subterete, with a shallow ventral groove.

** *Empty gls. as long as the flg. or longer.* Dupontia, *Br.* (Gen.).

6. **C. Wallichii,** *Hook. f.*; panicle subracemose few-fld., spikelets $\frac{1}{10}$–$\frac{1}{6}$ in. 1–2-fld.—Gramin., *Wall. Cat.* n. 8907.

Nepal, *Wallich.* Sikkim; Kankola Pass, alt. 14–15,000 ft., *J. D. H.*

Stem 6–18 in., from a shortly creeping base, slender or rather stout, smooth, nodes 1–2. *Leaves* 1–3 in., narrowly linear or filiform; ligule $\frac{1}{10}$ in. oblong, obtuse. *Panicle* 1–2 in., very narrow, usually reduced to a few-fld. raceme, erect; rachis smooth; branches with 1–3 spikelets, capillary, flexuous. *Spikelets* pendulous, green or purplish; rachilla with a setiform tip; gls. very thin, obtuse; I oblong 1–3-nerved; II broader, more obtuse, 3-nerves, side-nerves reaching about the middle; III broadly elliptic-oblong, 5-nerved, inner side-nerved very faint, glabrous or nearly so, outer and keel shortly hairy, keels of palea ciliate. *Lodicules* lanceolate, connate to the middle or below it. *Anthers* linear-oblong. *Grain* oblong, compressed.—The Sikkim specimens have somewhat smaller and paler spikelets than the Nepalese.

104. ERAGROSTIS, *Beauv.* (by O. Stapf.)

Annual or perennial grasses. *Stem* erect or geniculately ascending, very rarely prostrate. *Leaves* narrow. *Spikelets* many- (rarely 1–2-) fld., in open or contracted panicles, rarely in simple spikes, not articulate at the base (except *E. cynosuroides*), usually strongly laterally compressed; rachilla firm or subarticulate between the flg. glumes, not produced beyond the uppermost gl. *Glumes* many, broad, obtuse acute or mucronate, never awned, dorsally rounded and keeled; I and II much shorter than the spikelet, equal or unequal, empty, persistent or separately deciduous, 1-nerved or II 3-nerved; flg. glumes imbricating, at length deciduous from the rachilla, 3-nerved, all bisexual or the uppermost and rarely the lowest imperfect; palea broad, membranous, deciduous with its gl. or persistent on the rachilla, keels 2 ciliate scabrid or smooth. *Lodicules* 2, very minute. *Stamens* 2 or 3. *Ovary* glabrous; styles 2, stigmas

plumose. *Grain* minute, globose oblong ovoid or obovoid, free in the gl. and palea.—Species about 100, of warm countries.

The Asiatic and African species of this very difficult genus have been studied by Dr. Stapf, to whom I owe the classification and diagnoses of the Indian. With regard to their synonymy, and the citation of authorities, we have together endeavoured to determine these; but from the want of authentically named specimens of the species described by Roxburgh (under *Poa*) and by older authors, and of those enumerated in more recent works, we cannot hope to have attained complete accuracy in these respects.—*J. D. H.*

A. Spikelets panicled; panicle open contracted or spiciform.—Species 1–23.

Sect. I. CATACLASTOS. *Rachilla* of spikelets more or less jointed, and breaking up from above downwards.—Species 1–7.

* *Panicle spiciform, rachis bearded at the nodes; margins of flg. glumes ciliate.*

1. **E. phleoides,** *Stapf*; perennial, panicle compact subclavate, spikelets $\frac{1}{8}$–$\frac{1}{4}$ by $\frac{1}{12}$–$\frac{1}{8}$ in. 12- or fewer fld., flg. gls. mucronate, keels of palea long-ciliate. Dactylis phleoides, *Klein ex Steud. Nom. Ed.* II. i. 478. D. phleoides & spicata, *Herb. Heyne ex Wall. Cat.* n. 5015.—Eragrostoides, *Wall. l. c.*

SOUTHERN INDIA, *Heyne.*

Stems 1–3 ft., densely tufted, erect or geniculately ascending, very slender. *Leaves* 3–5 in., linear-lanceolate, finely acuminate, spreading, flat, glabrous, base rounded; sheath bearded close below the mouth; ligule a few hairs. *Panicle* 1–3 in. by $\frac{1}{5}$–$\frac{2}{3}$ in. diam., pale, rather shining; branches very short, villous at the nodes. *Spikelets* moderately compressed; gls. I and II subequal, acute; flg. gls. $\frac{1}{10}$–$\frac{1}{8}$ in., membranous, minutely scaberulous; nerves slender, prominent; palea $\frac{1}{4}$ shorter than its gl. *Anthers* $\frac{1}{60}$ in. *Grain* $\frac{1}{100}$–$\frac{1}{50}$ in., elongate-ellipsoid.

2. **E. ciliata,** *Nees Agrost. Bras.* 512; perennial, panicle cylindric compact, spikelets $\frac{1}{10}$–$\frac{1}{6}$ in. or smaller much compressed 6–12-fld., flg. gls. cuspidately acuminate, keels of palea long-ciliate. *Wight Cat.* n. 1788; *Steud. Syn. Gram.* 265; *Dalz. & Gibs. Bomb. Fl.* 298. E. rupestris, *Steud. l. c.* Poa ciliata, *Roxb. Fl. Ind.* i. 334. P. cylindrica, *Herb. Heyne* & incurvata, *Rottl. ex Wall. Cat.* n. 5014. P. duplo-ciliaris, *Roxb. Ic. Pict. ined.* t. 831. P. rupestris, *Roth. Nov. Pl. Sp.* 71.—Eragrostid. *Wall. l. c.*

BOMBAY; at Domus, *Dalz. & Gibs.* CHOTA NAGPORE, *Clarke.* SOUTHERN INDIA, *Heyne.*—DISTRIB. Cochin China.

Stems 2–4 ft., erect or geniculately ascending from a nodose base clothed with hard sheaths, smooth. *Leaves* linear-lanceolate, finely acuminate, widely spreading, flat or convolute, rarely $\frac{1}{4}$ in. broad, smooth, glabrous; sheath bearded close below the mouth; ligule a few hairs. *Panicle* 2–3 by $\frac{1}{3}$ in. diam.; branchlets hirsute. *Gls.* I and II acute, ciliate; flg. gls. $\frac{1}{16}$–$\frac{1}{8}$ in., membranous or subhyaline, minutely scaberulous, nerves prominent; palea $\frac{1}{3}$ shorter than its gl. *Anthers* about $\frac{1}{16}$–$\frac{1}{15}$ in. *Grain* ovoid to ellipsoid, $\frac{1}{50}$ in., terete.—I have not seen Bombay specimens.

3. **E. coarctata,** *Stapf.*; perennial, panicle elongate subspiciform often lobed or lax-fld., spikelets $\frac{1}{12}$–$\frac{1}{6}$ by $\frac{1}{24}$ in., slightly compressed 5–10-fld., flg. gls. obtuse, keels of palea long-ciliate. E. cylindrica, *Aitch. Cat. Punjab Pl.* 169 (*non Steud.*).—Eragrostis, *Wall. Cat.* n. 5003 (*in part*).

From the Upper Gangetic Plain, Moradabad, *Thomson*, to Sikkim, Behar, Chittagong, Arracan and Burma. Central Provinces & Chota Nagpore, *Clarke*.

Stems in small or large tufts, 4–18 in. high, geniculately ascending from a nodose branched stock, base clothed with short hard sheaths. *Leaves* linear, spreading horizontally, more or less convolute, finely acuminate, glabrous, sometimes flat and $\frac{1}{4}$ in. broad, quite smooth, glaucous; sheath rather tight, smooth, bearded below the mouth; ligule very short. *Panicle* 2–6 in. by $\frac{1}{2}$–$\frac{2}{3}$ in. broad, sometimes very narrowly pyramidal, white, branches hispid; gls. I and II subequal; flg. gls. $\frac{1}{16}$ in., membranous, nerves prominent. *Anthers* $\frac{1}{50}$ in. *Grain* shortly ovoid, $\frac{1}{50}$ in. —Dwarf states 2–3 in. high occur; and tall ones 2–3 ft. high from the Sikkim Terai and Arracan, with leaves $\frac{1}{3}$ in. broad and a long lax narrow panicle 6 in. long.

** *Panicle open or more or less contracted or spiciform; margins of flg. gls. ciliate.*

4. **E. aspera,** *Nees Fl. Afr. Austr.* 408; annual, panicle large thyrsiform, at length expanding, branches and pedicels long, spikelets linear-oblong $\frac{1}{5}$ by $\frac{1}{24}$ in. erect 4–16-fld., empty gls. subequal, flg. gls. obtuse nerves prominent, keels of palea scaberulous, stamens 3. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386. E. tenella, *Nees in Wight Cat.* n. 1783 (*non Linn. nec Benth.*). E. paniculata, *Steud. Syn. Gram.* 278. Poa aspera, *Jacq. Hort. Vind.* iii. 32. P. paniculata, *Roxb. Fl. Ind.* i. 340.—Eragrostis, *Wall. Cat.* n. 3841.

Southern India; Dindygul, *Wight*. Bangalore, *Puckle* (*Ic. in Herb. Kew*), N. and S. Concan, *Lisboa*.—Distrib. Afr. trop. Isle of France.

Stem with the long panicle 2–4 ft., stout, suberect, branched, smooth. *Leaves* 8–18 in., flat, keeled, smooth; sheath villously bearded; ligule of long hairs. *Panicle* 10–20 in. by 4–6 broad, oblong to obovate-oblong, rachis scaberulous, bearded at the nodes with long white hairs; branches solitary or pseudo-whorled, capillary, divided from the base or nearly so, suberect; pedicels much longer than the small, rather scattered spikelets. *Flg. gls.* hardly $\frac{1}{16}$ in.; palea obscurely 3-lobed, lobes very obtuse, keels scabrid. *Anthers* $\frac{1}{50}$ in. *Grain* subglobose, about $\frac{1}{60}$ in.—Panicle quite unlike that of any other Indian species.

5. **E. ciliaris,** *Link Enum. Hort. Berol.* i. 192; annual, panicle spiciform rarely open, branches and pedicels very short glabrous, spikelets about $\frac{1}{10}$ in. long and broad 6–12-fld strongly compressed, empty gls. subequal acute, flg. gls. widely spreading mucronulate, lateral nerves submarginal, keels of palea very long-ciliate, stamens 3.

Plains of N. and S. India (not in Ceylon).—Distrib. Reg. trop.

Stem 1–2 ft., procumbent below and geniculately ascending, slender. *Leaves* very narrow, flat; mouths of sheath with very long hairs. *Panicle* 3–6 in., interrupted or lobed below, appearing hairy from the long cilia of the palea, branches very short (except var. *Clarkei*) divided from the base, glabrous; nodes of glabrous rachis naked. *Spikelets* very pale, as broad as long, much compressed; flg. gls. subhyaline, scaberulous, often slightly recurved and elegantly distichous; rachilla of spikelet persistent. *Anthers* $\frac{1}{120}$ in. *Grain* elongate ovoid, about $\frac{1}{50}$ in.

Var. *ciliaris proper*, Stapf; panicle spiciform more or less lobed or interrupted. E. ciliaris, *Boiss. Fl. Orient.* v. 582; *Baker Fl. Maurit.* 456; *Duthie Grass. N.W. Ind.* 37, *Fodd. Grass. N. Ind.* 62; *Aitchis. Cat. Panjab. Pl.* 169; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386; *Griseb. Fl. Brit. W. Ind.* 532. E. lobata, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 396. E. lepida, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 424. E. plumosa, *Boiss. Fl. Orient.* v. 582 (*excl. Syn.*); *Benth. Fl. Hongk.* 431. E. pulchella, *Parl. in Hook. Niger Flor.* 186. Mega-

stachya ciliaris, *Beauv. Agrost.* 74.—Eragrostis, *Wall. Cat.* n. 5009, 5003 (*in part*).—N. India from the Panjab to Burma.—Westwd. to trop. Africa and America.

Var. *brachystachya*, Boiss. Fl. Orient. v. 582; panicle short compact cylindric. E. arabica, *Jaub. & Spach Ill. Pl. Orient.* iv. 31, t. 322. E. riparia, *Nees in Herb. Royle.*—Upper Gangetic Plain, Scind & the Concan.—Arabia, Afr. trop.

Var. *Clarkei*, Stapf; panicle open as in *E. tenella.*—Delhi, *Clarke.*

6. **E. tenella,** *Roem. & Sch. Syst.* ii. 576 (excl. β) (*non aliorum*); panicle variable, spikelets $\frac{1}{20}$–$\frac{1}{6}$ in. by $\frac{1}{24}$ in. broad or less, not strongly compressed 3–9-fld., empty gls. subequal or unequal, flg. gls. oblique not mucronate lateral nerves remote from the margins, keels of palea usually obscurely ciliate, stamens 3, grain ovoid.

Throughout INDIA, in the plains and lower hills, from the PANJAB to MALACCA and CEYLON. The NICOBAR ISLDS.—DISTRIB. Trop. Asia, Africa.

Very variable, from 6–18 in. high, stems usually slender, many from the root and densely tufted. *Leaves* narrow. *Panicle* 2–8 in. long, contracted or spreading, pale green or purplish, excessively branched, oblong ovate or cylindric, never with the long interrupted rachis and pseudo-verticillate branches of *E. interrupta.*

Var. *plumosa*, Stapf; panicle open often flexuous branches capillary nodes bearded, spikelets $\frac{1}{25}$–$\frac{1}{6}$ in. long- or short-pedicelled 3–9-fld., empty gls. unequal I $\frac{1}{3}$–$\frac{1}{5}$ shorter than II, rachilla subarticulate, flg. gls. $\frac{1}{30}$ in., anthers very minute, grain ovoid about $\frac{1}{60}$ in. E. despiciens, *Schult. Mant.* ii. 318. E. elegantula, *Nees* β., *Wight Cat.* n. 1781b. E. laxa, *Baker Fl. Maurit.* 456. E. plumosa, *Link Enum. Hort. Berol.* i. 192 (*non Boiss.*); *Wight Cat.* n. 1786; *Thw. Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 64, t. 38, 77; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 385. E. tenella, *Roem. & Sch. l. c.*; *Steud. Syn. Gram.* 266. Poa amabilis, *Linn. Sp. Pl.* 68. P. capillaris, *Roxb. Ic. Pict. ined.* t. 837. P. despiciens, *Link Enum. Hort. Berol.* i. 88. P. hirsuta, *Herb. Rottl.* P. plumosa, *Retz. Obs.* iv. 20; *Kunth Enum. Pl.* i. 338; *Roxb. Fl. Ind.* i. 337. P. tenella, *Linn. l. c.* 69. *Burm. Fl. Zeyl.* t. 47, f. 3); *Retz. Obs.* v. 19; *Kunth Rev. Gram.* ii. 467, t. 147, *Enum. Pl.* i. 338, *Suppl.* 294.—Eragrostis, *Wall. Cat.* n. 5007.—Throughout India, Burma & Ceylon (C.P. 926, 70).

Var. *riparia*, Stapf; panicle contracted very narrow flaccid, rachis glabrous, branches subfiliform or capillary, spikelets as in var. *plumosa*, empty gls. unequal I = $\frac{1}{3}$ shorter than II, flg. gls. $\frac{1}{25}$ in., anthers about $\frac{1}{100}$ in., grain $\frac{1}{60}$ in. ovoid. E. plumosa (*in part*) *Thw. Enum. Pl. Zeyl.* (CP. 927, 928). E. riparia, *Steud. Syn. Gram.* 265; *Nees in Wight Cat.* n. 1787; *Duthie Grass. N.W. Ind.* 38. E. ciliaris, β, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 397. E. plumosa, *var.* maritima, *Trim. Cat. Ceyl. Pl.* 109 (CP. 927). Poa incurva, *Herb. Rottl.* (*in part*). P. riparia, *Willd. in Ges. Naturf. Fr. Berl. N. Schrift.* iv. (1803) 185. P. setacea & laevis, *Herb. Rottl.* P. tenella, *Roxb. Fl. Ind.* i. 337; *Grah. Cat. Bomb. Pl.* 236.—Eragrost. *Wall. Cat.* n. 5011.—Lower Bengal, and southwd. Laccadive Islds. CEYLON (CP. 927, 928).

Var. *viscosa*, Stapf; stem and rachis of panicle below viscid, panicle stiff stouter with firmer more strongly nerved glumes than in vars. *plumosa* & *riparia*, oblong to linear open contracted or compact, branches filiform often very short, nodes glabrous or obscurely bearded, spikelets few–16-fld. often purplish, empty gls. subequal or I slightly shorter, fl. gls $\frac{1}{25}$–$\frac{1}{15}$ in., anthers about $\frac{1}{100}$ in., grain ovoid $\frac{1}{60}$–$\frac{1}{50}$ in.—Sub-var. α, *aperta*, Stapf; panicle oblong or pyramidal open, branches distinctly lengthened. E. viscosa, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 397; *Wight Cat.* n. 1785; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386. Poa ciliaris, *Roxb. Ic. pict. ined.* t. 832, 856. *Herb. Madr. Wall. Cat.* n. 5008 A. P. glutinosa, *Herb. Roxb.* P. plumosa & malabarica, *Herb. Heyne ex Wall. Cat.* n. 5008 C. D. E. P. Telphulia, *Herb. Ham. ex Wall. Cat.* n. 5008 B. P. viscosa, *Retz. Obs.* iv. 20; *Roxb. Fl. Ind.* i. 336; *Grah. Cat. Bomb. Pl.* 236; *Kunth Enum. Pl.* i. 336.—Eragrost. *Wall. Cat.* n. 5008, 5010.—From the Gangetic Plains & Bombay

southwd.—Trop. & S. Africa.—Subvar. β. *lasiantha*, Stapf; stem 2½ ft. erect branched, nerves of fl. gls. ciliate. E. terebinthacea, *Kurz mss.*—Pegu, *Kurz.* Burma, *Collett.* —Subvar. γ. *contracta*, Stapf; panicle compact spiciform lobed or interrupted, branches very short. E. mangalorica, *Hochst. ex Steud. Syn. Gram.* 265. E. viscosa, β. minor, *Nees in Wight. Cat.* n. 2359. ? E. viscosa, *Dalz. & Gibs. Bomb. Fl.* 298. Poa incurva, *Herb. Rottl.* (*in part*).—Deccan Peninsula.

Var. *breviculmis*, Stapf; stems 1–3 in. usually ascending from a prostrate base, panicle 1–1½ in. by 3–4 lines broad oblong to ovate-oblong rather dense but not compact, rachis bearded or not, empty gls. subequal, flg. gls. $\frac{1}{24}$ in., anthers $\frac{1}{150}$–$\frac{1}{120}$ in. or less, grain $\frac{1}{50}$ in.—From the Panjab to Behar and Central India.

7. **E. interrupta,** *Beauv. Agrost.* 71 (*non Roem. & Sch. nec Trin.*); panicle very variable usually stiff interrupted, spikelets $\frac{1}{12}$–$\frac{1}{4}$ in. ovate to linear few or many-fld., flg. gls. obtuse nerves slender, keels of palea scaberulous, stamens 2, grain obovoid.

Throughout INDIA, BURMA, CEYLON.—DISTRIB. Mesopot., Afr. trop.

Very variable, from 2–6 in. high with slender stems and ovate panicle to 3 ft. high and branched with the stem as thick as a small goose-quill, and a panicle 1–2 ft. long either contracted with appressed branches or interrupted with many tiers of rather short spreading subwhorled branches. *Spikelets* usually very minute, from $\frac{1}{20}$ in. with 2–3 flg. gls. to about $\frac{1}{4}$ in. with many flg. gls., green or pale brown, rarely coloured.

Var. *Koenigii*, Stapf; panicle long narrow with short dense pseudowhorls, spikelets shortly pedicelled usually 6–14-fld., flg. gls. $\frac{1}{32}$–$\frac{1}{28}$ in. or less. E. Koenigii, *Link Enum. Hort. Berol.* ii. 294; *Steud. Syn. Gram.* 266. E. hapalantha, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1839) 409 (*in part*). E. minutiflora, *Presl Rel. Hænk.* i. 274 (*excl. Syn.*); *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 386. E. mossulensis, *Steud. l. c.* 264. E. nutans, *Nees. in Wight Cat.* n. 1776; *Steud. Nom. Ed.* II. i. 563; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 63, t. 76; *Aitchis. Cat. Panjab Pl.* 169; *Lisboa l. c.* 381; *Boiss. Fl. Orient.* v. 583. E. Rothii, *Steud. Syn. Gram.* 267. E. stricta, *Steud. l. c.* 264. E. verticillata, *Nees in Wight. Cat.* n. 1784. Poa Corana, & P. diandra, *Herb. Ham. ex Wall. Cat.* n. 3850 F. D. P. interrupta, *Lamk. Ill.* i. 185; *Poir. Encycl.* v. 87; *Heyne ex Roth. Nov. Sp.* 67; *Koen. ex Roxb. Fl. Ind.* i. 335. P. Koenigii, *Kunth Enum. Pl.* i. 346. P. latifolia, *Wall. Cat.* n. 5001 E. P. nutans, *Koen. ex Roth. Nov. Sp.* 64; *Roxb. Fl. Ind.* 335 (*non Retz.*).—Eragrostis, *Wall. Cat.* n. 3850 A. D. E.—1. 5005, 5006.—All India. Ceylon, *Trimen.* Eastwd. to Egypt. As. and Afr. trop.

Var. *diarrhena*, Stapf; panicle long linear-oblong, branches 1–2 in. hardly whorled simple at the base, spikelets 10–14-fld., flg. gls. $\frac{1}{24}$ in. E. diandra, *Aitchis. Cat. Panjab Pl.* 169 (*non Steud.*); *Duthie Grass. N.W. Ind.* 37; *Griseb. in Goett. Nachr.* (1868) 76. E. diarrhena, *Steud. Syn. Gram.* 266. Poa diandra, *Roxb. Fl. Ind.* i. 336 (*non Br.*). P. diarrhena, *Schult. Mant.* 616.—Eragrostis, *Wall. Cat.* n. 3850 K. L., 5002, 5004.—Sirmore, Bengal, Mysore, Carnatic.

Var. *diplachnoides*, Stapf; stem tall stout branched, panicle long effuse or contracted flaccid, branches solitary or 2–3 in a whorl elongate simple or if branched the whorl rarely overtopped by 1 or 2 branches 2–5 in. long, ultimate branches not divaricate, spikelets 6–12-fld., flg. gls. very obtuse rarely $\frac{1}{32}$ in. E. diplachnoides & Hochstetteri, *Steud. Syn. Gram.* 268. E. nutans, *Thw. Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109. Diplachne elongata & poæformis, *Hochst. ex Steud. l. c.*—Central India, eastwd. to Afr. trop., *Clarke, Duthie.* Ceylon, *Walker, Thwaites* (CP. 933 (*in part*) 3259.

Var. *tenuissima*, Stapf; panicle long loose narrow usually stiff, branches ½–2 in. pseudo-whorled spreading ramified from the base, branchlets and pedicels divaricate filiform to capillary, spikelets few-fld., fl. gls. very obtuse $\frac{1}{32}$ in. E. aurea, *Steud. Syn. Gram.* 267. E. caudata, *Nees ex Steud. l. c.* 264; *Duthie Grass. N.W. Ind.* 37. E. japonica, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 405. E. tenella β, *Roem. & Sch. Syst.* ii. 356. E. tenella, *Benth. Fl. Hongk.* 431; *Fl.*

Austral. viii. 643 (*non Beauv.*); *Duthie Fodd. Grass. N. Ind.* 65, t. 78. E. tenellula, *Steud. Syn. Gram.* 279. E. tenuissima, *Schrad. ex Nees Fl. Afr. Austr.* 409, 410. Poa japonica, *Thunb. Fl. Jap.* 31. P. hyemalis, Laka, & speciosa, *Herb. Ham. ex Wall. Cat.* n. 3850 C. B. P. tenella, *Br. Prodr.* 181 (*non Beauv.*); *Roxb. Fl. Ind.* i. 337, *Ic. Pict. ined.* t. 837. P. tenellula, *Kunth Enum. Pl.* i. 338.—Eragrostis, *Wall. Cat.* n. 3850 B. C. H. 5001 A—D.—Temp. & trop. Himal. from the Panjab eastwd. and southwd. to Ceylon; ascends the Himalaya to 7000 ft.—Trop. As.

Sect. II. PTEROESSA. *Rachilla* of spikelet tough, persistent; flg. glumes falling away from its base upwards.—Species 8–24.

* Spikelets always flat, usually elliptic-ovate to oblong; lateral nerves of flg. gls. very prominent, straight, almost percurrent; paleæ deciduous with their glumes.

8. **E. amabilis,** *Wight & Arn. ex Nees in Hook. & Arn. Bot. Beech. Voy.* 251 (*excl. Syn. Linn.*) annual, panicle oblong or ovoid-oblong open or contracted, branches solitary ramifying from near the base, spikelets $\frac{1}{6}$–$\frac{1}{2}$ in. ovate rarely oblong or linear-oblong up to 50-fld., empty gls. subequal acute 1-nerved, flg. gls. very close set distichously spreading broadly elliptic shortly acuminate, palea elliptic keels winged scabrid. *Wight Cat.* n. 1777; *Wall. Cat.* n. 3838; *Nees in Act. Acad. Nat. Cur.* xix. *Suppl.* i. (1843) 205. E. polymorpha, *Trin. ex Steud. Nom. Ed.* II. i. 364, 562. E. rubens, *Hochst. ex Miq. Analect. Bot.* ii. 26; *Steud. Syn. Gram.* 265. E. unioloides, *Nees ex Steud. l. c.* 264; *Thw. Enum Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 65; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 383; *Griseb. in Goett. Nachr.* (1868) 76. Poa amabilis, *Herb. Rottl.* (*non Linn.*). P. multiflora, *Roxb. Fl. Ind.* i. 338. P. polymorpha, *Br. Prodr.* 180. P. pseudamabilis, *Roxb. Ic. Pict. ined.* t. 843. P. rubens, *Lamk. Illustr.* i. 184, t. 45, f. 2; *Kunth Enum. Pl.* i. 335. P. unioloides, *Retz. Obs.* v. 19; *Roxb. Fl. Ind.* i. 330; *Kunth l. c.*; *Grah. Cat. Bomb. Pl.* 236. Briza rubra, *Lamk. Ill.* i. 187; *Kunth l. c.* 371. Uniola indica, *Spreng. Syst.* i. 349; *Dalz. & Gibs. Bomb. Fl.* 298. Megastachya polymorpha, *Beauv. Agrost.* 74.

PLAINS OF INDIA and LOWER HIMALAYA, from Kashmir (ascending to 6000 ft.), eastwd. to Burma and southwd. to CEYLON (CP. n. 930).—DISTRIB. As. trop.

Stem 6–18 in., rather slender. *Leaves* usually short, flat; mouth of sheaths naked. *Panicle* 2–4 in., branches filiform, not very numerous or long, rachis and nodes glabrous. *Spikelets* broad or narrow, pale or purplish; rachilla tough, internodes very short, $\frac{1}{100}$ in.; empty gls. $\frac{1}{25}$–$\frac{1}{20}$ in. 1-nerved; flg. gls. nearly $\frac{1}{12}$ in. long, mucronulate; palea $\frac{1}{5}$–$\frac{1}{6}$ shorter than its gl. *Stamens* 3, anthers $\frac{1}{100}$–$\frac{1}{50}$ in. *Grain* obovoid or ellipsoid, laterally compressed, about $\frac{1}{3}$ by $\frac{1}{5}$ in.

** Spikelets usually linear or linear-oblong, less compressed and with less prominent nerves than in *, or if strongly compressed and nerved then with persistent paleas.

† Spikelets more or less fascicled on the primary or secondary branches or shortly pedicelled in narrower racemes.

9. **E. malayana,** *Stapf*; annual, panicle ovoid, branches solitary at length spreading flowering to the base, pedicels as long as the spikelets or shorter, spikelets $\frac{1}{10}$–$\frac{1}{5}$ in. linear-oblong 10–30-fld., rachilla almost straight internodes very short, gls. all broad closely imbricate, sides

convex, empty gls. unequal broadly ovate acute, fig. gls. ovate shortly acuminate keel curved, keels of palea scaberulous.

PERAK, *Wray*. MALACCA, *Hervey*.—DISTRIB. Borneo, Banca.

Stems densely tufted, 10–18 in., erect or geniculately ascending, very slender. *Leaves* 2–3 in., very narrow, strict, finely acuminate, convolute; mouth of sheath with long hairs. *Panicle* 2–3 in., open or contracted, branches ramified from near the base, branchlets short contracted filiform, rachis glabrous. *Spikelets* slightly compressed, rachilla tough; gl. I $\frac{1}{26}$ in.; II $\frac{1}{24}$ in.; fig. gls. $\frac{1}{25}$ in., mucronulate, lateral nerves inconspicuous; palea obovate-oblong, rather shorter than its gl., keels narrow. *Grain* $\frac{1}{30}$ in., ovoid or ellipsoid, slightly laterally compressed.

10. **E. stenophylla,** *Hochst. ex Miquel Analect. Bot. Ind.* ii. 27; branches of panicle much ramified from above the base, pedicels short filiform, spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. linear 30–40-fld., rachilla zigzag, empty gls. subequal subacute 1-nerved, fig. gls. ovate acute sides convex, keel curved, palea caducous with the gl. keels scabrid. *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 385. E. Brownei, *Nees in Wight Cat.* n. 1780 *partim* (*non Steud.*). E. elegantula, *Nees l. c.* 1781, *α*, *β* (*non Steud.*); *Duthie Grass. N.W. Ind.* 37, *Fodd. Grass. N. Ind.* 63, t. 74. E. gangetica, *Steud. Syn. Gram.* 266. E. ovina, *Nees ex Steud. l. c.* 268. ?E. Willdenovii, *Steud. Nom. Ed.* II. i. 565. P. amabilis & nutans, *Herb. Heyne ex Wall. Cat.* n. 3847 A. Poa amabilis, *Herb. Rottl.* (*non Linn.*). P. atroviridis, *Herb. Ham. ex Wall. Cat.* n. 3844 *partim* (*non Desf.*). P. gangetica, *Roxb. Fl. Ind.* i. 340. P. nutans, *Retz. Obs.* iv. 19 (*non Roxb.*); *Thwaites Enum. Pl. Zeyl.* 373. P. procera, *Hb. Wight ex Wall. Cat.* n. 3831 C. P. ovina, *A. Rich. Tent. Fl. Abyss.* ii. 428. P. viscosa, var. *Wall. l. c.* n. 3831.—Eragrostis, *Wall. Cat.* n. 3030 A, 3831 B. C. D., 3832 A. (*in part*) 3043 E., 3844, 3847.

Throughout INDIA and BURMA. CEYLON, *Thwaites* (CP. 925, 932).—DISTRIB. Trop. Asia and Africa.

Annual or subperennial. *Stems* many, densely tufted, 12–18 in. high, geniculately ascending. *Leaves* rather short, smooth, usually strict and convolute; sheaths smooth. *Panicle* ovate or oblong or sublinear, subflexuose, inclined; branches rather distant, alternate, obliquely spreading when ripe, ramifications short, contracted. *Spikelets* crowded, blue grey, rachilla tough; gl. I $\frac{1}{32}$ in.; II $\frac{1}{25}$ in. or shorter; fig. gls. $\frac{1}{15}$ to $\frac{1}{20}$ in. or more, lateral nerves slender; palea rather shorter than its gl., gently curved. *Stamens* 3, anthers minute about $\frac{1}{120}$–$\frac{1}{100}$ in. *Grain* about $\frac{1}{100}$ in., globosely oblong to subglobose.

11. **E. elegantula,** *Steud. Syn. Gram.* 266 (*non Nees*); perennial, panicle oblong, branches solitary short, pedicels very short, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. linear to linear-oblong 8–30-fl., rachilla tough, empty gls. subequal acute 1-nerved, fig. gls. ovate acute sides convex, palea caducous with the gls. keels scabrid. *Griseb. in Goett. Nachr.* (1868) 75; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 384. E. Brownei, *Nees ex Wight Cat.* n. 1780; *Aitchis. Cat. Panjab. Pl.* 169; *Duthie Grass. N.W. Ind.* 36, *Fodd Grass. N. Ind.* 62. E. luzoniensis, *Steud. l.c.* 266. Poa atroviridis, *Ham. ex Wall. Cat.* n. 3843 A. P. convoluta, *Heyne in Herb. Rottl.*; *Wall. Cat.* n. 3831 E. P. Chariis, *Schult. Mant.* i. 314. P. diandra & cernua, *Herb. Wight ex Wall. Cat.* n. 3843 B. C. P. distans & laevis, *Hb. Heyne ex Wall. l. c.* n. 3840. P. elegantula, *Kunth Revis. Gram.* i. 340, *Enum. Pl.* i. 346. P. elegans, *Roxb. Fl. Ind.* i 338. P. viscosa, var. *Herb. Heyne in Wall. Cat.* 3831 A.—Eragrost. *Wall. Cat.* n. 3830 B. C., 3831 A, 3832 B, 3833, 3840, 3843, 3845 A (*in part*).

Throughout INDIA, BURMA and CEYLON (*Wallich*, *Gardner*).

Stem tall, 1–3 ft., suberect from a spreading base, usually stout and branching, but sometimes slender and short, smooth. *Leaves* few, short, smooth, flat or subconvolute; mouth of sheath bearded. *Panicle* nodding, branches rather distant, spreading, ramifying from above the base, sometimes abbreviated and the spikelets clustered on the rachis, rachis glabrous. *Spikelets* purplish or green; empty gls. $\frac{1}{25}$ in.; flg. gls. $\frac{1}{15}$–$\frac{1}{14}$ in., lateral nerves slender; internodes of rachilla $\frac{1}{70}$–$\frac{1}{50}$ in.; palea rather shorter than its gls. *Stamens* 3, anthers about $\frac{1}{32}$ in. *Grain* oblong, $\frac{1}{32}$ by $\frac{1}{70}$–$\frac{1}{60}$ in.

12. **E. elongata,** *Jacq. Eclog. Gram.* 3, t. 3; perennial, panicle very variable, branches usually simple, spikelets very shortly pedicelled rather crowded subparallel linear $\frac{1}{6}$–$\frac{1}{10}$ in. 10–25-fld., rachilla rather stout, empty gls. ovate-lanceolate acute, I 1-nerved, II 1–3-nerved, flg. gls. ovate-lanceolate very acute nearly flat, keel almost straight, palea strongly curved, keels very stout scabrid. E. bahiensis, *Hance in Journ. Linn. Soc.* xiii. (1873) 136; *Griseb. in Goett. Nachr.* (1868) 76 (*non Schrad.*). E. Browneana, *Nees in Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 205. E. Brownii, *Nees Fl. Afr. Austr.* 396; *Steud. Syn. Gram.* 279; *Thwaites Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109; *Benth. Fl. Hongk.* 432, *Fl. Austral.* vii. 646 (*in part*). E. Cumingii, *Steud. l. c.* 266. E. interrupta, *Steud. l. c.* 279 (*non Beauv.*). E. orientalis, *Nees in Nov. Act. l. c.* 206; *Thw. l. c.* 373; *Trim. l. c.* 109. E. pubescens, *Steud. l. c.* E. Willdenoviana, *Nees in Hook. & Arn. Bot. Beech. Voy.* 252. E. zeylanica, *Nees & Mey. in Nov. Act. l. c.* 204; *Thwaites l. c.*; *Trim. l. c.* Poa Brownei, *Kunth Revis. Gram.* i. 112, *Enum. Pl.* i. 333. ? P. dependens, *Hornem. Enum. Hort. Hafn. Suppl.* 2. P. elongata, *Willd. Enum. Hort. Berol.* i. 108; *Kunth Enum.* i. 384. P. interrupta & polymorpha, *Br. Prodr.* 180. P. pulchella, *Wall. mss.* Megastachya elongata & polymorpha, *Beauv. Agrost.* 74, 167. —Eragrost. *Wall. Cat.* n. 3836, 3845 (*in part*).

LOWER BENGAL, CHITTAGONG, BURMA, the NICOBAR ISLDS., and CEYLON (C.P. 931, 3047, 3251).—DISTRIB. Asia trop., Malaya, Australia, N. Caledon.

Stems tufted, stiff, tall or short, stout or slender, simple or branched. *Leaves* narrow, strict, flat or convolute; mouth of sheath bearded. *Panicle* oblong or ovate, with solitary distant spreading filiform branches, or from the shortening of these subspiciform, rachis glabrous. *Spikelets* acute, dark brown or reddish; gl. I $\frac{1}{25}$–$\frac{1}{16}$ in.; II $\frac{1}{17}$ in.; flg. gls. usually $\frac{1}{12}$ in., firm, lateral nerves rather prominent; rachilla rather stout, internodes $\frac{1}{50}$ in.; palea $\frac{1}{5}$–$\frac{1}{6}$ shorter than its gl. *Anthers* $\frac{1}{100}$–$\frac{1}{60}$ in. in the Indian specimens. *Grain* ovoid to subglobose, $\frac{1}{50}$ in.

†† Spikelets not fascicled, usually more or less divaricate when ripe.

§ *Spikelets* $\frac{1}{12}$–$\frac{1}{4}$ in. *broad*; *flg. gls. broad, more or less obtuse,* $\frac{1}{15}$–$\frac{1}{10}$ in. *long, lateral nerves strong.—Annuals.*

13. **E. barbulata,** *Stapf.*; leaf-margins eglandular, panicle oblong very loose, branches solitary, pedicels very slender, spikelets few $\frac{1}{3}$–$\frac{2}{3}$ in. ovate-oblong or linear narrowed upwards 10–25-fld., empty gls. subequal ovate obtuse, rachilla stout nodes bearded, fl. gls. close-set very broadly ovate obtuse, palea broadly ovate persistent keels scabrid, grain subglobose. —Eragrostis, *Wall. Cat.* n. 3839.

LOWER BURMA; road to the Petroleum Wells, *Wallich*.

Annual, erect, 3–4 ft. high, branched. *Leaves* 12–18 in., up to $\frac{1}{4}$ in. broad, usually very narrow, subconvolute, and sheaths pubescent or villous below the middle. *Panicle* 6–12 in.; nodes of rachis woolly at the axils; branches very

distant, scaberulous, spreading, flexuous, simple at the base; pedicels as long or longer than the pale olive-green spikelets. *Gl.* I 1-nerved; II 1–3-nerved; rachilla tough, internodes about $\frac{1}{70}$–$\frac{1}{80}$ in.; flg. gls. $\frac{1}{10}$ in., nerves strong. *Stamens* 3; anthers linear, about $\frac{1}{20}$ in. *Grain* $\frac{1}{30}$ in. long.—A stately species.

14. **E. tremula,** *Hochst. ex Steud. Syn. Gram.* 269; leaf-margins eglandular, panicle large ovate very loose branches solitary, pedicels very slender, spikelets versatile 1 in. or more linear narrowed upwards 10–70-fld., empty gls. subequal subobtuse, rachilla tough glabrous, flg. gls. close-set very broadly ovate subobtuse, palea obovate-oblong persistent keels scabrid, grain globose. *Duthie Fodd Grass. N. Ind.* 65, *t.* 79; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 382; *Boiss. Fl. Orient.* v. 581. E. multiflora, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1841) 401; *Dalz. & Gibs. Bomb. Fl.* 298; *Duthie Grass. N.W. Ind.* 38; *Aitchis. Cat. Panjab. Pl.* 169. E. rhachitricha, *Hochst. ex Miquel Analect. Bot. Ind.* ii. 25. Poa curvata, *Hb. Heyne ex Wall. Cat.* n. 3849. P. multiflora, *Roxb. Fl. Ind.* i. 338 (*non Forsk.*). P. tremula, *Lamk. Illust.* i. 185; *Kunth l. c.* 332.—Eragrost. *Wall. Cat. l. c.*

Northern India; from the PANJAB to BENGAL and BURMA, and southward to the CARNATIC.—DISTRIB. Affghan., Africa trop.

Annual. *Stems* densely tufted, suberect, 6–24 in., leafy chiefly at the sometimes hardened base. *Leaves* few, short, very narrow; mouth of sheath slightly hairy. *Panicle* often as long as the rest of the plant and 8 in. broad, nodding; rachis glabrous, axils bearded, branchlets and pedicels roughish; pedicels longer or shorter than the spikelets which are pale green or purplish. *Empty gls.* $\frac{1}{16}$–$\frac{1}{20}$ in., 1-nerved; internodes of rachilla $\frac{1}{50}$ in., thickened upwards; flg. gls. $\frac{1}{16}$–$\frac{1}{12}$ in., nerves strong; palea a little shorter than its gl. *Stamens* 3, anthers $\frac{1}{100}$ in. *Grain* hardly $\frac{1}{50}$ in. diam.

15. **E. major,** *Host. Gram. Austr.* iv. 14, t. 24; leaf-margins (in Indian specimens) glandular, panicle oblong to ovate-oblong stiff, branches subsolitary spreading, pedicels very short, spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. ovate-oblong or linear few to 50-fld., empty gls. ovate acute, rachilla tough, flg. gls. broadly ovate subacute, palea broadly obovate much curved, keels scabrid or ciliolate, grain globose. E. flexuosa, *Steud. Syn. Gram.* 266; *Duthie Grass. N.W. Ind.* 37. E. megastachya, *Link Enum. Hort. Berol.* i. 187; *Kunth Enum. Pl.* i. 333; *Reichb. Ic. Fl. Germ.* t. 91; *Wight Cat.* n. 1778; *Thwaites Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 109; *Aitchis. Cat. Panjab Pl.* 169; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 63, t. 75; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 382; *Ledeb. Fl. Ross.* iv. 382; *Boiss. Fl. Orient.* v. 580. E. multiflora, *Aschers. ex Boiss. l. c.* E. poaeoides, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 404. E. vulgaris *var.* megastachya, *Coss. et Dur. Fl. Alger.* 148. Poa cilianensis, *All. Fl. Pedem.* ii. 246, t. 91, f. 2. P. elegans, *Herb. Wight & Herb. Ham. ex Wall. Cat.* n. 3828 C. D. P. Eragrostis, *Cav. Ic.* i. 63, t. 92; *Sibth. Fl. Græc.* t. 73. P. flexuosa, *Roxb. Fl. Ind.* i. 339. P. multiflora, *Forsk. Fl. Æg. Arab.* 21. P. polymorpha, *Koen. ex Wall. l. c.* n. 3828 A. P. Roxburghiana, *Schult. Mant.* ii. 315. P. subsecunda, *Herb. Ham. ex Wall. l. c.* n. 3828 D. P. tortuosa, *Spreng. Syst. Veg.* i. 345. Megastachya Eragrostis, *Beauv. Agrost.* 74. Briza Eragrostis, *Linn. Sp. Pl.* 70; *Schreb. Besch. Græs.* ii. 74. B. oblonga, *Moench. Meth.* 185.—Eragrostis, *Wall. Cat.* n. 3828, 3837.

Throughout the PLAINS and lower HILLS of INDIA and BURMA, ascending to 5200 ft. in the Himalaya. CEYLON, (C.P. 3163).—DISTRIB. Westward to S. Europe, Asia trop. and subtrop.

Annual. *Stem* 1–2 ft., usually stout and branched, but very variable. *Leaves* flat, smooth, flaccid, narrow, rarely ¼ in. broad; sheath sparingly bearded. *Panicle* 2–8 in., sometimes contracted, rachis glabrous, branches stiff or flexuous, ramifying from or near the base. *Spikelets* slightly narrowed upwards, dark olive-grey; Gl. I, 1- or sub-1–3-nerved; II 3-nerved; flg. gls. $\frac{1}{12}$ in., uppermost usually empty and smaller, nerves strong; palea $\frac{1}{4}$–$\frac{1}{5}$ shorter than its gl. *Anthers* about $\frac{1}{60}$ in *Grain* $\frac{1}{50}$–$\frac{1}{35}$ in., loose within the turgid gl.

§§ Spikelets $\frac{1}{6}$–$\frac{1}{3}$ in.; fl. gls. less than $\frac{1}{16}$ in. or if longer then narrower and more or less acute.

‡ *Panicle rather stiff, branches and lateral pedicels usually short lateral nerves of flg. gls. strong.—Leaf-margins often glandular.*

16. **E. minor,** *Host Gram. Austr.* iv. 15, *Fl. Austr.* i. 135; leaf-margins glandular, panicle ovate or oblong rather stiff, branches solitary capillary ramifying from near the base, pedicels short, spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. linear to ovate up to 12-fld., empty gls. subequal acute 1-nerved, flg. gls. broadly ovate obtuse, grain globose or ellipsoid-globose dorsally convex. E. poaeformis, *Link Hort. Berol.* i. 188; *Reichb. Ic. Fl. Germ.* t. 91; *T. Nees Gen. Fl. Germ. Monocot.* n. i. 55. E. poaeoides, *Beauv. Agrost.* 76; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 65; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 387; *Ledeb. Fl. Ross.* iv. 380; *Boiss. Fl. Orient.* v. 580. E. poaeoides β, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 404. Poa Eragrostis, *Linn. Sp. Pl.* 68 (*in part*); *Kunth Enum. Pl.* i. 332; *Schreb. Beschr. Græs.* ii. t. 38; *Host Gram. Austr.* ii. 50, t. 69. Briza Eragrostis, *Vill. Fl. Delph.* ii. 50 (*non Linn.*).

Plains of Northern India, ascending the Himalaya to 8000 ft., from the Panjab eastwards to Bengal. The Concan, *Jacquemont*, &c. Western Tibet; Ladak, alt. 12–13,000 ft., *Thomson.*—Distrib. Westward to S. Europe, N. Asia.

Annual. *Stems* 6–18 in., densely tufted, slender. *Leaves* rather short, flat; mouth of sheath slightly bearded. *Panicle* 2–6 in., rachis glabrous, branches spreading when ripe. *Spikelets* pale green to dark purplish or olive-grey, glistening; rachilla tough; gls. I and II $\frac{1}{25}$–$\frac{1}{16}$ in., keel scabrid; flg. gls. $\frac{1}{16}$ rarely $\frac{1}{15}$–$\frac{1}{12}$ in., lateral nerves strong; palea $\frac{1}{6}$ shorter than its gl., obovate-oblong, keels scabrid or subciliate. *Stamens* 3, anthers $\frac{1}{100}$ in. *Grain* $\frac{1}{50}$ in. or more, dorsally rounded or slightly flattened.—The glands are a very constant character. A single Bombay specimen is *eglandular*, but placed here from its strong resemblance to glandulíferous specimens also from Bombay. The Tibetan specimens are very small, 1–6 in. high.

17. **E. Rottleri,** *Stapf*; leaf-margins eglandular, mouth of sheath naked, panicle oblong open rather stiff, branches solitary or lower geminate ramifying from near the base, pedicels of lateral spikelets very short, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. linear 6–12-fld., empty gls. subequal, rachilla tough, flg. gls. oblong subacute, palea persistent, grain terete. E. viscosa, *Wight Herb. propr.* n. 1785, *in part.* Poa pauciflora, *Herb. Rottl.*

The Carnatic; at Tranquebar, *Heyne, Rottler, Wight.*

Leaves 1–7 in., flat or more or less convolute. *Panicle* 2–6 in., rachis naked, branches filiform to capillary. *Spikelets* pale brown or white; empty gls. about $\frac{1}{25}$ in.; flg. gls. $\frac{1}{15}$–$\frac{1}{20}$ in., lateral nerves strong; palea rather shorter than its gl., keels scaberulous. *Stamens* 3, anthers about $\frac{1}{100}$ in. *Grain* $\frac{1}{50}$ in.—Rottler's *P. pauciflora* is a tall form with few spikelets. Wight's specimen has the stem viscid

below the panicle as in *E. tenella* var. *viscosa*, with certain forms of which *P. Rottleri* has much in common. The persistent rachilla with deciduous glumes of *E. Rottleri* are as in *E. minor*, as are the scabrid not ciliate keels of the palea.

18. **E. Willdenoviana,** *Nees in Wight Cat.* n. 1779 (non in *Nov. Act. Nat. Cur.* xix. *Suppl.* i. (1843) 205); leaf-margins rarely glandular, panicle short ovate stiff open, branches solitary capillary, pedicels short, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. by $\frac{1}{25}$ in. linear pale up to 25-fld., empty gls. very unequal. I minute hyaline nerveless, fl. gls. broadly elliptic acute, palea oblong persistent, grain truncate at both ends dorsally grooved. E. poaeoides, *Trim. Cat. Ceyl. Pl.* 109; *Herb. Ind. Or. H. f. & T.* (the *Carnatic* plant). Poa glabra & lævis, *Rottl. mss.* ? P. polymorpha, *Koen. ex Rottl. in Schrift. Naturf. Fr. Berl.* iv. (1803) 194.—Eragrostis, *Wall. Cat.* n. 3848.

Mysore, *Rottler*, *Heyne*; Dindygul, *Wight*. Ceylon; Trincomalee, *Glenie* (C.P. 3944).

Annual. *Stems* 4–18 in., very slender, smooth, rigid, erect or geniculately ascending. *Leaves* short, flat, narrow, erect, rather rigid; mouth of sheath naked. *Panicle* 1–3 in., branches spreading when ripe, ramifying from near the base; pedicels (except sometimes the terminal) shorter than the spikelets. *Spikelets* olive-grey or greenish; gl. I $\frac{1}{50}$–$\frac{1}{36}$ in; II ovate, acute, $\frac{1}{25}$ in., 1-nerved; flg. gls. $\frac{1}{15}$–$\frac{1}{20}$ in., lateral nerves strong; palea $\frac{1}{5}$–$\frac{1}{4}$ shorter than its gl., keels scaberulous. *Stamens* 3, anthers about $\frac{1}{100}$ in. *Grain* oblong, $\frac{1}{35}$–$\frac{1}{60}$ in., dorsally flattened and grooved.—This may prove to be E. polymorpha, *Roem. & Sch. Syst.* ii. 575. Rottler's specimen was named *P. polymorpha*, but that name was crossed out and replaced by *P. glabra*, Nob. *E. Willdenoviana*, Nees in Hook. & Arn. Bot. Beech. Voy. (of China) is *E. elongata*.

‡‡. *Panicle very loose, ramifications very slender often flexuous or flaccid; lateral nerves of flg. gls. usually faint.—Leaves eglandular.*

19. **E. tenuifolia,** *Hochst. in Flora*, xxiv. (1841) i. *Intell.* 20, *name only; ex Steud. Syn. Gram.* 268; perennial, panicle oblong to ovate very open, rachis glabrous, branches solitary or 2-nate distant, spikelets ^{2}–$\frac{1}{12}$ in. by $\frac{1}{6}$ in. linear 5–15-fld., empty gls. very unequal, I minute hyaline, rachilla tough, fl. gls. ovate acute, subacute or apiculate, palea $\frac{1}{3}$ shorter than its gl. strongly curved persistent, grain obovate-oblong. E. collocarpa, *K. Schum. in Engl. Pflanzenw. Deutsch-Ost. Afr.* C. 114. ? E. mucronata, *Roem. & Sch. Syst.* ii. 577. E. parviglumis, *Hochst. ex Steud. l. c.* 267. Poa tenuifolia, *A. Rich. Tent. Fl. Abyss.* ii. 425.

Nilghiri Hills, *Hohenacker*. Belgaum, *Ritchie*; Satpura Hills, *Thompson*. —Distrib. Africa trop.

Stem 2–3 ft., erect, slender, branched. *Leaves* long, very narrow; mouth of sheath naked. *Panicle* 3–6 in.; branches ramifying from near the base and branchlets rather distant, spreading, filiform, stiff, shorter than in *E. nigra*. *Spikelets* olive-grey; gl. I $\frac{1}{50}$–$\frac{1}{30}$ line nerveless; II remote from I, about $\frac{1}{30}$ in., ovate, subacute, nerveless or faintly 1-nerved; flg. gls. $\frac{1}{12}$ in., keels of palea scabrid. *Stamens* 3, anthers $\frac{1}{25}$ in. *Grain* $\frac{1}{12}$ in., slightly compressed, dorsally grooved.

20. **E. papposa,** *Steud. Nom. Ed.* II. i. 564; perennial, panicle ovoid very delicate lax open sparingly branched, rachis glabrous, branches solitary rarely 2-nate branchlets stiff divaricate, pedicels long capillary, spikelets $\frac{1}{6}$–$\frac{1}{3}$ in. linear 7–23-fld., empty gls. subequal or I shorter hyaline, rachilla tough, flg. gls. broadly ovate margins above hyaline, palea obtuse denticulate persistent, grain obovoid. *Willk. & Lange Prodr. Fl. Hispan.* i. 83; *Griseb. in Goett. Nachr.* (1868) 75. E. atro-virens, *Lange in Koehj.*

Vedinsk. Meddel. (1860) 47 (*non Desf.*). E. rigidifolia, *Hochst. Herb. Mem. Div. Forsk.* (*nomen.*). E. speirostachya, *Coss. et Dur. ex Lange l. c.* E. verticillata, *Coss. ex Lange l. c.* (*non Cav.*). E. vulgaris, *var.* speirostachya, *Coss. et Dur. Fl. Alger.* 148. Poa nigra, *Clem. ex Willk. & Lange Prodr. Fl. Hisp.* i. 83. P. papposa, *Desf. in Roem. & Sch. Syst.* ii. 585. Megastachya? papposa, *Roem. & Sch. l. c.*

N.-EASTERN PANJAB; common in the Trans-Indus districts; Rawul Pindi, &c., *Stewart, Aitchison.*—DISTRIB. Westward to Arabia, N. Africa, and Spain.

Stem 12–18 in., very slender, simple. *Leaves* short, strict, very narrow, convolute; mouth of sheath bearded with long silky hairs. *Panicle* 4–8 in.; rachis filiform; branches spreading, alternate, almost capillary, naked below, loosely branched beyond the middle with capillary spreading branchlets. *Spikelets* very pale yellow or dark or pale olive-grey; gl. I $\frac{1}{35}$–$\frac{1}{25}$ in. or less, nerveless; II $\frac{1}{25}$–$\frac{1}{20}$ in., faintly 1-nerved; flg. gls. about $\frac{1}{17}$ in.; palea rather shorter, keels scabrid. *Stamens* 3, anthers $\frac{1}{100}$ in. *Grain* $\frac{1}{50}$–$\frac{1}{36}$ in., dorsally grooved.—A very elegant species, with usually quite pale very narrow spikelets.

21. **E. pilosa,** *Beauv. Agrost.* 71; annual, panicle oblong to pyramidal flaccid open or contracted, rachis glabrous or hairy, branches usually more or less whorled and branchlets very slender, pedicels longer or shorter than the spikelets which are $\frac{1}{5}$ in. linear 5–12-fld., empty gls. unequal hyaline, rachilla tough, flg. gls. ovate acute, palea subpersistent keels scaberulous, grain ellipsoid. *Reichb. Ic. Fl. Germ.* t. 91; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 55; *Thw. Enum. Pl. Zeyl.* 373; *Trim. Cat. Ceyl. Pl.* 209; *Wight Cat.* n. 1784, 1784b.; *Duthie Grass. N.W. Ind.* 38, *Fodd. Grass. N. Ind.* 64; *Aitchis. Cat. Panjab Pl.* 170; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 381, *Ledeb. Fl. Ross.* iv. 382; *Boiss. Fl. Orient.* v. 881; *Benth. Fl. Hongk.* 432, *Fl. Austral.* vii. 645; *Baker Fl. Maurit.* 455; *Griseb. Fl. Brit. W. Ind.* 532. E. elegantula, *a*, *Nees in Wight Cat.* n. 1782. E. indica, *Steud. Syn. Gram.* 264. E. parviflora, *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 411. E. pellucida, *Steud. l. c.* 279. E. punctata, *Link. ex Steud. Nom. Ed.* II. i. 561, *Syn. Gram.* 264. E. verticillata, *Roem. & Sch. Syst.* ii. 575; *Reichb. Ic. Fl. Germ.* t. 9; *Aitchis. Cat. Panjab Pl.* 170. Poa amabilis, *Herb. Heyne ex Wall. Cat.* n. 3829 B. P. indica, *Koen. ex Röttl. in Ges. Naturf. Fr. Berl. Neue Schrift.* iv. (1803) 194. P. nutans, *Herb. Wight ex Wall. Cat.* n. 3829 D. P. parviflora & pellucida, *Br. Prodr.* 180. P. Phullica, *Herb. Ham. ex Wall. l. c.* 3829 C. & 5012 (*Phulcia*). P. pilosa, *Linn. Sp. Pl.* 68; *Host Gram. Austr.* ii. 168, t. 68; *Kunth l. c.* 329. P. punctata, *Linn. f. Suppl.* 109; *Kunth Enum. Pl.* i. 330; *Roxb. Fl. Ind.* i. 338. P. tenella, *Herb. Heyne ex Wall. l. c.* 3829 B. P. verticillata, *Cav. Ic.* i. 63, t. 93; *Kunth Enum.* 329. Milium tenerum, *Herb. Heyne ex Wall. l. c.* 3829 B.—Eragrostis, *Wall. Cat.* n. 3829.

Throughout INDIA and BURMA; ascending the Himalaya to 5000 ft. or more. CEYLON; common (C.P. 929).—DISTRIB. S. Europe and most warm countries.

Stem 3 in.–3 ft., tufted, erect, usually very slender and simple, rarely stout and branched. *Leaves* short, narrow, flaccid or strict and convolute, rarely elongate; mouth of sheath bearded. *Panicle* very variable in size and form, erect inclined or nodding; rachis hairy or not at the nodes; branches filiform or capillary, fascicled or sub-whorled, simple below, lower sometimes 6 in. long. *Spikelets* usually grey tipped with purple; empty gls. nerveless or II faintly 1-nerved; flg. gls. $\frac{1}{10}$–$\frac{1}{8}$ in. *Stamens* 3, anthers $\frac{1}{60}$ in., violet. *Grain* $\frac{1}{18}$–$\frac{1}{15}$ in., base laterally apiculate.—Dwarf specimens 2–4 in. high look very different from the ordinary state of the plant.

22. **E. nigra,** *Nees ex Steud. Nom. Ed.* II. i. 563, *Syn. Gram.* 267; perennial, basal sheaths narrow terete or obscurely compressed, panicle oblong to ovate large open lax-fld., branches usually many in whorls or fascicles rarely solitary or geminate, spikelets up to $\frac{1}{6}$ in. linear to oblong 3–9-fld., empty gls. subequal acuminate strongly 1-nerved, flg. gls. ovate acute, palea obtuse denticulate persistent, grain short truncate at both ends. *Griseb. in Goett. Nachr.* (1868) 75; *Duthie Grass. N.W. Ind.* 38. E. atropurpurea, *Hochst. ex Steud. Syn. Gram.* 267. E. amabilis, *Willd. non Linn. ex Ham. in Wall. Cat.* n. 3842. E. paniculata, *Thwaites Enum. Pl Zeyl.* 373 (*non Steud.*).—Eragrostis, *Wall. Cat.* n. 3834, 3835, 3842, 3846.

Temp. and trop. HIMALAYA, ascending to 9000 ft. from Simla to Sikkim and the KHASIA HILLS, and southward throughout the DECCAN PENINSULA. CEYLON, *Thwaites* (C.P. n. 2626).

Stem 6 in.–3 ft., erect, stout or slender, usually stout and leafy at the base, simple or branched. *Leaves* in small forms chiefly basal and flat, in taller elongate; mouth of sheath bearded. *Panicle* up to 2 ft. long and broad, very copiously but loosely branched except in small specimens, rachis glabrous at the nodes, branches simple below, pedicels usually longer than the spikelets. *Spikelets* olive-grey; empty gls. membranous, keels scabrid; flg. gls. $\frac{1}{16}$–$\frac{1}{14}$ in. *Stamens* 3, anthers $\frac{1}{50}$ in. *Grain* $\frac{1}{32}$ in. or smaller, dorsally slightly grooved.—Habit as variable as of *E. pilosa*.

23. **E. ferruginea,** *Beauv. Agrost.* 71; perennial?, basal sheaths broad compressed keeled, panicle oblong, branches solitary or 2-nate filiform rather stiff, pedicels longer than the spikelets, spikelets $\frac{1}{4}$ in. linear to ovate 3–11-fld., empty gls. unequal acute 1-nerved, rachilla tough, flg. gls. ovate acute or acuminate, palea obtuse much shorter than its gl. persistent keels scabrid, grain obovoid truncate at both ends. *Franch. & Sav. Enum. Pl. Jap.* ii. 177; *Miq. Prolus. Fl. Jap.* 188. E. orientalis, *Trin. in Bunge Enum. Pl. Chin. Bor.* 71, *in Mem. Acad. Petersb. Ser.* VI. iv. II. (1838) *Suppl.* 73. Poa ferruginea, *Thunb. Fl. Jap.* 50.

SIKKIM HIMALAYA; Lachoong Valley, alt. 9000 ft., in meadows with *E. nigra*, J. D. H.—DISTRIB. N. China, Japan.

Stem with the panicle in the Sikkim specimen 18 in., erect. *Leaves* 3–5 in., narrow, or the lower broad at the base; sheath naked at the mouth. *Panicle* 4–6 in., shorter than in *E. nigra*, with stouter branches and fewer spikelets; branches rather wiry, bearing few dark spikelets. *Spikelets* dull green to violet. *Gl.* I about $\frac{1}{6}$ in., shorter than II; flg. gls. $\frac{1}{11}$–$\frac{1}{9}$ in. *Stamens* 3, anthers $\frac{1}{12}$ in. or less. *Grain* $\frac{1}{12}$ in., slightly grooved or flattened dorsally.—I have seen only a poor Indian specimen, but it seems to be identical with the Chinese and Japanese plant. Bunge says that the same plant is cultivated in Hort. Petrop. from Nepal seeds.

B. Sect. III. DESMOSTACHYA, Stapf. *Spikelets* much compressed, imbricate, secund, sessile and jointed on the very short densely crowded branchlets of a tall narrow racemiform panicle, deciduous, acute; rachilla subarticulate.

24. **E. cynosuroides,** *Beauv. Agrost.* 71, 162; perennial, tall, branched from the base, leafy, panicle linear-elongate, branches very short crowded, densely covered from the base with sessile imbricating much compressed deflexed spikelets $\frac{1}{2}$ in. long up to 30-fld., empty gls. very unequal, rachilla tough, flg. gls. broadly ovate acute, palea shorter than its gl. *Steud. Syn. Gram.* 264; *Wight Cat.* n. 1774, 1774b.; *Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 415; *Dalz. & Gibs. Bomb. Fl.* 298; *Aitchis*

Cat. Panjab. Pl. 169; *Duthie Grass. N.W. Ind.* 37, *Fodd. Grass. N. Ind.* 62, t. 40; *Boiss. Fl. Orient.* v. 583; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 387. Poa cynosuroides, *Retz. Obs.* iv. 20; *Roxb. Fl. Ind.* i. 333; *Del. Fl. Ægypt.* 159, t. 10; *Grah. Cat. Bomb. Pl.* 236; *Kunth Enum. Pl.* i. 227. Leptochloa bipinnata, *Hochst. in Flora*, xxxviii. (1855) 422. Briza bipinnata, *Linn. Syst. Nat.* x. 875. Cynosurus durus, *Forsk. Fl. Ægypt. Arab.* 71. Dactylis interrupta, *Herb. Rottl.* Uniola bipinnata, *Linn. Sp. Pl. Ed.* II. 104.—Eragrost. affine & Eragrostoides, *Wall. Cat.* n. 3821, 5016.

PLAINS of INDIA, from Peshawur and Sind to Burma and southward, in moist places. (Not in Ceylon).—DISTRIB. Westward to Syria and N. Africa.

Rootstock stout, creeping; stolons very stout clothed with shining sheaths; stems 1-3 ft., tufted, smooth, erect, stout. *Leaves* many, basal fascicled, very long, rigid, long acuminate tips filiform, margins hispid; mouth of sheath with long hairs; ligule 0. *Panicle* 6–18 in. by 1 rarely 2 in. broad, strict, erect, narrowly pyramidal or columnar, often interrupted; rachis puberulous, branches $\frac{1}{4}$–1 in., very many crowded; branchlets rigid, glabrous or hispidulous, spreading. *Spikelets* unilateral, 2-seriate and crowded, deflexed, pale brown, rather shining; internodes of rachilla very short; gl. I $\frac{1}{50}$ in.; II about $\frac{1}{15}$ in., obtuse; flg. gls. $\frac{1}{16}$–$\frac{1}{12}$ in., coriaceous; palea $\frac{1}{5}$–$\frac{1}{6}$ shorter than its gl., rather coriaceous, keels minutely scabrid. *Stamens* 3, anthers $\frac{1}{25}$ in. *Grain* less than $\frac{1}{40}$ in., obliquely ovoid, laterally compressed, obscurely trigonous.

C. Sect. IV. PLAGIOSTACHYA, *Benth.* Spikelets secund distichously spreading in a long simple slender terminal spike.

* *Keels of palea distinctly winged.*

25. **E. leioptera,** *Stapf.*; perennial, leaves convolute wiry, spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. oblong compressed 10–20-fld., glumes tumid, I $\frac{1}{14}$ in. acute, wings of keels of palea $\frac{1}{100}$ in. broad eciliate.

KHASIA HILLS, alt. 4–5000 ft., *Griffith*, &c.

Stems 1–2 ft., densely tufted, erect, very slender, strict. *Leaves* 8–12 in., glabrous, stout, terete, pungent; sheaths short. *Spike* 6–10 in., erect, strict; rachis angular, smooth. *Spikelets* not crowded, suberect; empty glumes $\frac{1}{14}$ in. subequal, or I shorter; I acutely keeled; II dorsally rounded; flg. gls. broadly ovate, obtuse or subacute, $\frac{1}{10}$ in.; wings of palea hyaline. *Anthers* about $\frac{1}{16}$ in. long.—The more tumid glumes at once distinguish this from *E. bifaria*.

26. **E. bifaria,** *Wight ex Steud. Nom. Ed.* II. i. 562, *Syn. Gram.* 264, *Suppl.* 282; perennial, leaves flat or complicate and keeled, spikelets $\frac{1}{4}$–$\frac{2}{3}$ in. ovate-oblong rarely linear much compressed 6–40-fld., wings of keels of palea about $\frac{1}{100}$ in. broad ciliate. *Wall. Cat.* n. 3827 B. C.; *Wight Cat.* n. 1773; ? *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 387. E. thraulostachys, *K. Schum. ined.* Poa bifaria, *Vahl Symb.* ii. 19; *Roxb. Fl. Ind.* i. 331; *Kunth Revis. Gram.* i. 334, t. 80, *Enum. Pl.* i. 327, *Suppl.* 282.

The DECCAN PENINSULA, *Heyne*, &c.—DISTRIB. Africa trop.

Stem 1–3 ft., densely tufted, erect, simple, subcompressed, glabrous, base clothed with the soft fibres of old sheaths. *Leaves* 2–2½ in., linear, wiry, sometimes $\frac{1}{6}$ in. broad, flexuous, acute, rigid, smooth; sheaths scaberulous, keeled; ligule a ciliate line. *Spike* 10–12 in., ovate to oblong and 15–20-fld., rarely linear flexuous and up to 40-fld., erect, rachis smooth, subcompressed. *Spikelets* spreading, lower fewer-fld., olive-grey or -green; gl. I very acute or acuminate; II almost $\frac{1}{12}$ in., keel very stout, rounded; flg. gls. $\frac{1}{8}$ in., broadly ovate, subacuminate, keel scaberulous above, nerves faint. *Stamens* 3, anthers $\frac{1}{25}$ in.

27. **E. Collettii,** *Stapf*; perennial, leaves filiform convolute, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. linear or oblong-linear slightly compressed 6–12-fld., glumes tumid, wings of keels of palea about $\frac{1}{200}$ in. broad minutely ciliate.

Burma; Pinmona, *Abul Huk*; Meiktalla, *Collett.*

Stems 18–20 in., densely tufted, very slender, bases densely clothed with a brush of soft filiform fibres $\frac{3}{4}$ in. long. *Leaves* 2–4 in., glabrous or sparsely hairy. *Spike* 5–7 in., erect, strict or slightly curved; rachis slender, terete, smooth. *Spikelets* purplish, erect, close-set, almost imbricating; empty gls. subequal, $\frac{1}{16}$–$\frac{1}{14}$ in., I acutely keeled; II dorsally rounded; flg. gls. $\frac{1}{12}$ in. or less, turgid, broadly ovate, obtuse or acute with incurved tips; palea almost as long as the gl., dorsally pubescent. *Anthers* almost $\frac{1}{25}$ in.

** *Keels of palea not or obscurely winged.*

28. **E. nardoides,** *Trin. in Mem. Acad. Petersb.* VI. i. (1831) 415; perennial leaves 3–9 in. almost capillary convolute with tufts of hairs on the surface below the middle, spike very long slender, spikelets $\frac{1}{3}$–$\frac{1}{2}$ in. and upwards oblong to linear 20–32-fld., glumes turgid. E. bifaria, *Wall. Cat.* n. 3827 D. F.; *Duthie Grass. N.W. Ind.* 36; *Fodd. Grass. N. Ind.* 61, t. 73; *Griseb. in Goett. Nachr.* (1863) 76; *Steud. Syn. Gram.* 266.

Outer Himalaya, from the Panjab to Nepal, up to 5500 ft. Behar, on Parasnath, and Chota Nagpore, *Clarke, J. D. H.*

Stems 12–18 in., densely tufted, filiform. *Leaves* as long as the stem or shorter. *Spike* 6–10 in., very slender, straight or subflexuous; rachis terete, smooth. *Spikelets* erecto-patent, close-set, laterally compressed, olive-green; empty gls. subequal or I slightly shorter, acutely keeled; II $\frac{1}{12}$ in. or less, obtusely keeled; flg. gls. nearly $\frac{1}{12}$ in., ovate, acute or subobtuse, nerves faint, keel smooth or nearly so. *Anthers* $\frac{1}{25}$ in. *Grain* $\frac{1}{50}$ in. or more, narrowly ellipsoid or subovoid, subterete or obscurely triquetrous, epicarp finely reticulate.

29. **E. coromandelina,** *Trin. in Mem. Acad. Petersb.* VI. i. (1831) 415; perennial, leaves 1–3 in. filiform convolute puberulous above, spikelets $\frac{1}{6}$–$\frac{1}{2}$ by $\frac{1}{12}$ in. oblong to linear 10–32-fld. *Steud. Syn. Gram.* 264. E. cretacea, *Nees in Ann. Nat. Hist.* i. (1838) 284. Poa coromandelina, *Koen. ex Rottl. in Ges. Naturf. Fr. Berl. Neue Schrift.* iv. (1803) 191; *Roth. Nov. Pl. Sp.* 71; *Kunth Enum. Pl.* i. 327. P. secunda, *Roxb. Ic. pict. ined.* t. 827.

Plains of India; from Rajputana to Behar, and southwards. Chota Nagpore, *Wood.* Upper Burma, *Abdul Huk.*

Stem 12–18 in., rather stout. *Leaves* short, rarely flat, spreading and recurved. *Spike* 4–8 in., interrupted; rachis slender, terete, smooth. *Spikelets* close-set, erecto-patent, laterally compressed, olive-grey or -green; empty gls. equal or I slightly shorter, acutely keeled; II $\frac{1}{12}$ in. or less, usually obtusely keeled; flg. gls. up to $\frac{1}{12}$ in., ovate, acute or subobtuse, nerves faint, keel smooth or nearly so; palea almost as long as its gl., keels sometimes obscurely winged scabrid. *Stamens* 3, anthers $\frac{1}{32}$ in. *Grain* $\frac{1}{50}$–$\frac{1}{36}$ in., shortly ellipsoid or subovoid, obtusely 3-quetrous, epicarp loosely reticulate.

30. **E. secunda,** *Nees ex Steud. Syn. Gram.* 264; perennial, leaves 6–18 in. convolute or flat minutely puberulous above, spike very slender flaccid, spikelets $\frac{1}{2}$ in. linear-oblong up to 10-fld., empty gls. unequal. E. bifaria, *Thwaites Enum. Pl. Zeyl.* 373 (*excl. Syn.*); *Trim. Cat. Ceyl. Pl.* 109.

Ceylon, ascending to 5000 ft., *Walker, Thwaites* (C.P. 60).

Spikelets secund or distichous, laterally compressed, olive-grey or straw-colrd.; empty gls. unequal, I about $\frac{1}{12}$ in. acutely keeled; II $\frac{1}{7}$ in., dorsally rounded; flg. gls.

$\frac{1}{8}$ in., ovate, acute; palea with rather narrow scabrid keels. *Anthers* $\frac{1}{16}$ in. long. *Grain* almost $\frac{1}{25}$ in., elongate ovoid or ellipsoid, almost terete.—The materials for this species consist of only two specimens, one from Thwaites (C.P. 60), with leaves 6–7 in. convolute, erecto-patent; the other, from Walker, with much longer flat or subconvolute leaves 8–10 in. long.

31. **E. brachyphylla,** *Stapf*; perennial leaves $2\frac{1}{2}$–4 in. linear plicate glabrous above. spikelets $\frac{1}{4}$–$\frac{3}{4}$ in. oblong to linear about 20-fld., empty gls. subequal. E. bifaria, *Wall. Cat.* n. 3827 A. E. E. bifaria, *β.* minor, *Wight & Arn. in Wight Cat.* n. 1773 C. & *Herb.* n. 3528, 3356. Poa secunda, *Roxb. ex Wall. Cat. l. c.* A. P. bifaria, *Vahl*, & P. coromandelina, *Roth. ex Wight Cat.* n. 1773b.

From BEHAR and the CENTRAL PROVINCES, southward to the Nilghiris, *Wight*, *Perrottet*.

Stem densely tufted, 10–18 in., slender. *Leaves* coriaceous, acute, rarely flat and $\frac{1}{16}$ in. broad. *Spikes* 3–6 in., slender. *Spikelets* close-set, usually secund, slightly compressed, olive-green; empty gls. up to $\frac{1}{12}$ in., I acute, acutely keeled; II obtuse, dorsally rounded; flg. gls. up to $\frac{1}{12}$ in., broadly ovate, obtuse, keel scaberulous below the tip; keels of palea narrow, scabrid. *Anthers* $\frac{1}{32}$ in. *Grain* $\frac{1}{50}$–$\frac{1}{36}$ in., shortly ellipsoid, obscurely triquetrous, almost terete, epicarp coarsely reticulate.

INDETERMINABLE SPECIES RECORDED AS INDIAN.

E. cernua, *Steud. Syn. Gram.* 266. Poa cernua, *Willd. in Ges. Naturf. Fr. Berl. Neue Schrift.* iv. (1803) 182.

E. confinis, *Nees ex Steud. l. c.* 265.

105. **MYRIOSTACHYA,** *Hook. f.*

A tall stout perennial glabrous grass. *Leaves* very long, flat. *Spikelets* 4–20-fld., racemed on the short branchlets of a narrow elongate panicle, pedicels jointed at the base; rachilla stout, flexuous, naked, at length jointed at the base and between the fl. gls. *Glumes* coriaceous, dorsally rounded, I and II very small, ovate, 1-nerved, keeled, long-awned; flg. gls. ovate, cuspidately acuminate, keeled, 3-nerved; palea coriaceous, as long as its gl., tip 2-toothed, keels close together stout scabrid-ciliate. *Lodicules* very minute, obliquely cuneate, retuse. *Stamens* 3, anthers very small. *Ovary* globose, styles united at the very base, stigmas long penicillate. *Grain* obliquely ovoid, obtuse, subterete, scutellum large.—*Eragrostis*, Sect. Myriostachya, *Benth. in Journ. Linn. Soc.* xix. (1881) 117.

M. Wightiana, *Hook. f.* Eragrostis Wightiana, *Benth. in Hook. Ic. Pl.* xiv. 62, t. 1381. Leptochloa Wightiana, *Nees ex Steud. Syn. Gram.* 209; *Wight Cat.* n. 1757. Dinebra verticillata, *Wight ex Steud. l. c.* Festuca natans, *Ham. in Wall. Cat.* n. 3823.—Eragrost. affine, *Wall. l. c.*

Marshes in the SUNDERBUNDS, *Hamilton*, *Griffith*, &c. S. INDIA? *Herb. Wight.* TENASSERIM, *Helfer*.

Stem 6–10 ft., densely tufted, erect from a stout sheathed sometimes floating rootstock with long branching roots, as thick as the thumb at the base, smooth, simple or sparingly branched. *Leaves* several feet long, up to $\frac{1}{2}$ in. broad, linear, finely acuminate, quite smooth; sheath very long, narrower than the blade, of lower leaves broad and compressed; ligule 0. *Panicle* 1–2 ft. by 2–3 in. broad; rachis quite smooth; branches 1–$1\frac{1}{2}$ in., very many, crowded fascicled and whorled erecto-

patent, flowering to the base. *Spikelets* ¼–⅓ in., 4–8-fld., compressed, quite smooth; pedicels short; gls. I and II unequal, keels scaberulous, awn ⅓ in. or more stiff stout.—In many respects *Myriostachya* is allied to *Eragrostis cynosuroides*, having a very similar inflorescence, and spikelets jointed on the branchlets of the panicle; but differs in the spikelets being pedicelled, in the long awned gls. I and II, and in its great size.

Var. *longispicula*; spikelets longer, up to ½ in. and 8–20-fld.—Penang, *Curtis*. Ceylon; at Kottiyar, *Trimen*.

106. **HALOPYRUM,** *Stapf.*

A tall stout perennial glabrous grass, with a branching creeping sheathed rootstock. *Leaves* narrow, rigid, convolute. *Spikelets* large, many-fld., sessile or shortly pedicelled on the short alternate branches of an elongate panicle, ovate, strongly laterally compressed, not jointed on their pedicels, nor are the pedicels on the branches; rachilla jointed at the base and between the flg. glumes, silkily hairy. *Glumes* many, closely distichously imbricate, dorsally rounded, coriaceous, keeled, I and II subequal, empty, ovate-lanceolate, acuminate or apiculate; I 3-nerved, II 5-nerved; flg. gls. 6–10, rather shorter than the empty, mucronulate, 3-nerved; palea as long as the gl., subacute, 2-keeled. *Lodicules* 2, obcordate. *Stamens* 3. *Styles* short, free, stigmas elongate. *Grain* ellipsoid, compressed, deeply hollowed anticously, free.

H. mucronatum, *Stapf in Hook. Ic. Pl.* t. 2448. Brizopyrum mucronatum, *Nees in Wall. Cat.* n. 8898; *Wight Cat.* n. 2386. Desmazeria unioloides, *Defl. Voy. Yemen*, 220. Eragrostis mucronata, *Trim. Cat. Ceyl. Pl.* 109 (*non Roem. & Sch.*). ? Uniola mucronata, *Linn. Sp. Pl.* 104; *Kunth Enum. Pl.* i. 425; *Steud. Syn. Gram.* 281. Triticum repens, *Thwaites Enum. Pl. Zeyl.* 376.—Æluropus, *Aitchis. Cat. Panjab Pl.* 169. —Eragrostis sp. Sect. Sclerostachya, *Benth. in Gen. Plant.* iii. 1187.

Coasts of INDIA from Sind to Cape Comorin and Tinnevelly. CEYLON, *Gardner*, &c.—DISTRIB. Westward to Arabia and E. trop. Africa.

Stem below creeping, as thick as a crow-quill, hard, smooth, woody, with strict vermiform roots, sending up rigid slender flowering stems 12–18 in. high, and shorter leafing ones. *Leaves* 8–12 in., flat or convolute, very narrow, wiry, glaucous, finely acuminate, glabrous, sheath terete, appressed, striate, hard, mouth villous; ligule a few hairs. *Panicle* 12–16 in., erect or inclined; branches short with few spikelets and rachis quite smooth. *Spikelets* ½ in. long, sessile or shortly pedicelled, smooth, white or pale yellowish; rachilla very short, hairs half as long as the gls.; gl. I hardly longer than the lowest flg. gl., ovate-lanceolate, apiculate, 5-nerved towards the centre; II ⅓ longer, strongly 5-nerved.—There being no specimen of *Uniola mucronata* in Linnæus's Herbarium its citation here is doubtful.

107. **COELACHYRUM,** *Nees.*[1] (See p. 8.)

108. **DIPLACHNE,** *Beauv.*

Tall perennial grasses. *Leaves* flat or convolute, narrow. *Spikelets* many-fld., spicate on the slender simple branches of a tall simple panicle,

[1] This genus was erroneously supposed to be Indian when the Key was drawn up.

not jointed at the base; rachilla jointed at the base and beneath each flg. gl., not produced beyond the uppermost gl. *Glumes* many, I and II unequal, obtuse, membranous, 1-nerved, persistent; flg. gls. rather longer, oblong, 1–3-nerved, tip 2–4-toothed, mucronate or awned; palea linear. *Lodicules* 2, broad. *Stamens* 3, anthers short. *Styles* distinct, stigmas plumose. *Grain* ovoid-oblong, subtrigonous, free within the gls. and palea. —Species about 14, of warm regions.

A second Indian species has lately been brought from Chitral, and will shortly be published by Dr. Stapf in the Kew Bulletin as *D. Gatacrei*.

D. fusca, *Beauv. Agrost.* 163; tall, leaves convolute, panicle long, spikelets $\frac{1}{4}$–$\frac{1}{2}$ in. linear 4–10-fld. *Benth. Fl. Austral.* vii. 619; *Boiss. Fl. Orient.* v. 561; *Trim. Cat. Ceyl. Pl.* 109. D. indica, *Spreng. Syst.* i. 351. Uralepis fusca, *Steud. Syn. Gram.* 247; *Thwaites Enum. Pl. Zeyl.* 372. U. Drummondii, *Steud. l. c.* Triodia ambigua, *Br. Prodr.* 183. Tridens indicus, *Nees in Wight Cat.* n. 1794. Leptochloa? fusca, *Kunth Revis. Gram.* i. 91, *Enum. Pl.* i. 271. Festuca fusca, *Linn. Sp. Pl.* 109; *Del. Fl. Ægypt.* 24, t. xi. f. 1. F. indica, *Retz. Obs.* iv. 21; *Kunth Enum.* 412. F. reptatrix, *Linn. Sp. Pl. Ed.* II. 108; *Kunth l. c.* 410. Eragrostis procera, *Steud. l. c.* 266. Poa procera, *Roxb. Fl. Ind.* i. 332; *Kunth l. c.* 345. Bromus polystachios, *Forsk. Fl. Æg. Arab.* 23. Eragrostis, *Wall. Cat.* n. 5013.—*Rheede Hort. Malab.* xii. t. 45.

Upper Gangetic Plain to Bengal and southward to Ceylon.—Distrib. Egypt, Trop. Asia, Africa, and Australia.

Stem tufted, 3–5 ft., stout, erect, or geniculately ascending, often branched, clothed with leaf-sheaths. *Leaves* long, narrow, flat or convolute, smooth; sheaths smooth; ligule large, membranous, lacerate. *Panicle* 10–18 in., oblong, nodding; rachis smooth; branches 2–3 in., erect, filiform, smooth or scaberulous. *Spikelets* distant, very shortly pedicelled, pale or dark green; rachilla smooth or scaberulous; callus hairy; gls. I and II 1-nerved, tips erose, keels nearly smooth; I lanceolate; II $\frac{1}{3}$ longer, oblong; flg. gls. thinly coriaceous, 3-nerved, lateral nerves submarginal, tip 4-toothed, mucronate by the percurrent median nerve.

109. **MELICA,** *Linn.*

Perennial erect grasses. *Leaves* narrow. *Spikelets* in open or spiciform or racemiform panicles, laterally compressed, jointed or not on their pedicels, 1–3-fld. and with small convolute neuter gls. forming a clavate o narrow body terminating and jointed on the elongate rachilla. *Glumes* 4 or more, membranous, hyaline or with hyaline tips and margins; I and II equal or unequal, empty, I 1–3-nerved; II 5-nerved, persistent or separately deciduous; flg. gls. solitary, or 2–3 then distant on the rachilla, 5–9-nerved, lowest stipitate; palea 2-keeled. *Lodicules* 2, connate, often most minute or 0. *Stamens* 3. *Styles* free, stigmas plumose. *Grain* oblong fusiform or subcylindric.—Species probably 20 or 30, of temp. regions.

* *Panicle spiciform or racemiform; spikelets more or less jointed on their pedicels; lodicules most minute or* 0.

1. **M. Cupani,** *Guss. Fl. Sicul. Prodr. Suppl.* 17; panicle subspiciform, flg. gl. solitary clothed all over with long silky hairs. *Boiss. Fl. Orient.* v. 590; *Parlat. Fl. Ital.* i. 301. M. ciliata, *Duthie Grass. N.W. Ind.* 39 (*non Linn.*). M. Jacquemontii, *Decne in Jacquem. Voy. Bot.* 174, t. 175; *Duthie l. c.* M. Hohenackeri, *Boiss. Diagn. Ser.* I. xiii. 54. M.

micrantha, *Boiss. & Heldr.* var. inæqualis, *Griseb. in Goett. Nachr.* (1868) 76. M. persica, *Kunth Revis. Gram.* i. 351, t. 89. *Enum. Pl.* i. 375, *Suppl.* 311; *Ledeb. Fl. Ross.* iv. 398; *Duthie l. c.*; *Griseb. l. c.* 76, 77. M. trachyantha, *Boiss. Diagn. Ser.* I. vii. 124.

Western Himalaya; in the drier regions from Kumaon westwards, alt. 7–11,000 ft. Western Tibet, alt. 8–11,000 ft.—Distrib. Westwards to Spain and N. Africa.

Stems 8–18 in., densely tufted, creeping below, very slender. *Leaves* 2–8 in., very narrow, flat or convolute, and as well as the sheaths glabrous puberulous or tomentose with spreading or reflexed hairs; ligule oblong, short, or 0. *Panicle* 2–4 in.; rachis filiform, smooth; branches very short and pedicels scaberulous. *Spikelets* more or less secund, $\frac{1}{6}$–$\frac{1}{3}$ in. long, suberect or spreading, pale straw-colrd. or dark purple; rachilla glabrous, very short slender and geniculate below the flg. gl., stouter and strict beyond it, articulate beneath the neuter gls. *Glumes* all scaberulous, I $\frac{1}{2}$–$\frac{1}{3}$ shorter than II, ovate, subacute, 1–3- rarely 5-nerved; II lanceolate, acute, 5-nerved; flg. gl. about as long as II, clothed with straight hairs nearly as long as itself that spread when dry, 7-nerved; palea oblong, 2-toothed, scaberulous, keels ciliolate; lower neuter gls. coriaceous, glabrous scabrid hispidulous or rarely sparsely hairy, usually obliquely clavate and truncate, rarely oblong, strongly nerved. *Lodicules* 0 or most minute. *Grain* fusiform.—A most variable plant, presenting, according to Boissier, eight varieties, and under which are ranged fourteen species of his own and other authors. The Indian specimens may be roughly classed under two very distinct-looking forms, which, but for Boissier's wider experience and authority, I should have been disposed to regard as species; though I find specimens which seem to be intermediate between them. These are, *M. Cupani*, Guss. (which includes *trachyantha*, Boiss.) with stems 12–18 in. high, pale straw-colrd. spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. long, with gl. II usually only about $\frac{1}{3}$ longer than I; and *M. persica*, Kunth (including *Jacquemontii*, Decne.), with stems 6–12 in. high, purple (rarely pale yellowish) spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. long, and gl. II almost twice as long as I. In both the leaves or their sheaths or both, are glabrous or tomentose, and the club-shaped neuter gls. from nearly smooth to scabrid.

2. **M. nutans,** *Linn. Sp. Pl.* 66; panicle racemiform very lax, spikelets 2-fld., gls. I and II cymbiform very obtuse, III quite glabrous. *Fl. Dan.* t. 962; *Host Gram. Austr.* ii. 9, t. 10; *Gærtn. Fruct.* ii. 5, t. 80, f. 4; *Schreb. Gram.* ii. 62, t. 6, f. 2; *Engl. Bot.* t. 1059; *Knapp Gram. Britt.* t. 42; *Kunth Enum. Pl.* i. 376; *Cav. Ic.* t. 175; *Reichb. Ic. Fl. Germ.* t. 72; *Steud. Syn. Gram.* 291; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 60; *Ledeb. Fl. Ross.* iv. 399; *Boiss. Fl. Orient.* v. 568.

Kashmir, *Falconer*; at Hirpoor, alt. 8000 ft., *Clarke*.—Distrib. Europe, N. Asia.

Stem 10–18 in., very slender, inclined, from a long stoloniferous rootstock. *Leaves* 6–10 in., very narrow, acuminate, sparsely hairy; ligule very short or 0. *Panicle* long, nodding or drooping, rachis and few branches secund, capillary. *Spikelets* $\frac{1}{4}$ in. long, few, distant, very shortly pedicelled, pendulous, broadly oblong; gls. I and II subequal, scarious, green or purplish; III oblong, strongly many-nerved, scaberulous. *Lodicules* minute, connate. *Grain* fusiform.

** *Panicle with spreading branches; spikelets not jointed on their pedicels; gl. I and II persistent; neuter gls. forming a small oblong body; lodicules 2, connate.*

3. **M. scaberrima,** *Hook. f.*; branches of panicle elongate opposite alternate or 3-nate, spikelets 3–5-fld., gls. I and II ovate-lanceolate, flg. gls. narrowly lanceolate. Festuca scaberrima, *Nees ex Steud. Syn. Gram.* 316. Glyceria scaberrima, *Steud. l. c.*; *Duthie Grass. N.W. Ind.* 41. Poa Zizania, *Jacquem. mss.*

Western Temperate Himalaya; from Kashmir to Kumaon, alt. 6–10,000 ft.

Stem 3–5 ft., very slender, flaccid, smooth. *Leaves* 8–10 by $\frac{1}{6}$–$\frac{1}{3}$ in., more or less scabrid; sheaths scabrid, hirsute on the upper margins; ligule short, truncate, 2-auricled. *Panicle* very variable, rarely reduced to a subsimple raceme; rachis filiform; branches 2–5 in., at length horizontal, often 2 in. apart, smooth or scabrid. *Spikelets* often irregularly disposed, shortly pedicelled, crowded on short branchlets, or distantly scattered, $\frac{1}{4}$–$\frac{1}{3}$ in. long, pale green; rachilla slender, scaberulous; gl. I and II ovate-lanceolate, I 1-nerved; II 3-nerved; flg. gls. distant, lowest about twice as long as II, narrowly lanceolate, strongly 7–9-nerved, tip quite entire; palea shorter than its gl., keels scaberulous. *Lodicules* very minute. *Anthers* variable in length. *Grain* subcylindric or fusiform.—Closely allied to the Affghan *M. secunda*, Regel (M. gracilis, *Aitch. & Hemsl.*) a native of Affghan. and Turkestan.

Var. *micrantha*; spikelets $\frac{1}{5}$ in., leaf-sheaths nearly smooth, ligule hardly auricled.—Kishtwar, alt. 6000 ft., *Clarke*.

110. **LOPHATHERUM,** *Brongn.*

Tall slender leafy perennial grasses. *Leaves* petioled, lanceolate, acuminate, nerves tessellate. *Spikelets* 1-fld., narrowly lanceolate, terete, solitary, secund and jointed on the long strict alternate branches of a lax panicle; rachilla not jointed at the base, produced beyond the flg. gl. and bearing several closely sheathing awned empty gls. *Glumes* dorsally rounded, I and II empty, oblong, obtuse, margins membranous, 5-nerved, deciduous with the flg. gl.; III much longer, coriaceous, ovate-oblong, 7–9-nerved, mucronate or shortly awned; keels of palea narrowly winged, smooth. *Lodicules* 0. *Stamens* 3. *Styles* connate at the base, stigmas long. *Grain* oblong, free.—Species 1 or 2, trop. Asia.

L. gracile, *Brongn. in Duperr. Voy. Bot.* 50. t. 8; *Kunth Enum. Pl.* i. 391; *Steud Syn. Gram.* 300; *Benth. Fl. Hongk.* 433; *Thwaites Enum. Pl. Zeyl.* 374; *Trim. Cat. Ceyl. Pl.* 109; *Miq. Fl. Ind. Bat.* iii. 400. L. elatum, *Zoll. & Mor. Syst. Verz. Zoll.* 102. L. japonicum, multiflorum and dubium, *Steud. Syn. Gram.* 300. L. Lehmanni, *Nees ex Steud. l. c.* Acroelytrum japonicum, *Steud. in Flora*, xxix. (1846) 21. Allelotheca Urvillei, *Steud. Syn. Gram.* 117.—Centothecæ affine, *Wall. Cat.* n. 8900. —*Griff. Ic. Pl. Asiat.* t. 152, f. 2.

Tropical Himalaya, from Sikkim eastwards; the Khasia and Naga Hills, Burma, Ceylon (up to 4000 ft.), and the Malaya Peninsula.—Distrib. China, Japan, Malaya, N. Guinea.

Stem 2–5 ft., ascending from a branched woody rootstock. *Leaves* 4–10 by $\frac{1}{2}$–$1\frac{1}{4}$ in., narrowed into a slender petiole $\frac{1}{4}$–$\frac{1}{2}$ in. long; sheaths smooth; ligule minute. *Panicle* of few distant strict stiff smooth branches, 6–18 in. long. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., including the short awns of the closely imbricate upper empty glumes, which form a pencil of short erect or spreading bristles projecting from the apex of the tightly rolled flg. gls.—It is remarkable that this plant has not been observed in the Deccan Peninsula.

DOUBTFUL SPECIES.

L. dubium, *Steud. Syn. Gram.* 300.—*Herb. Wight.* n. 1090. The description is of leaves only, and quite unrecognizable.

111. **CENTOTHECA,** *Desv.*

Tall perennial grasses. *Leaves* broadly lanceolate, tessellately nerved. *Spikelets* 1–2-fld., secund on the long branches of a lax subsimple panicle,

not jointed on the very short pedicels; rachilla jointed at the base and between the flg. gls. *Glumes* 5, I and II oblong-ovate, keeled, 3–5-nerved, empty, persistent; flg. gls. oblong, acute, dorsally rounded, 7-nerved, naked or the upper bearing soft erect at length deflexed tubercle-based spines above the middle; palea shorter than the gl., keels ciliolate. *Lodicules* 0. *Stamens* 2–3, anthers short. *Styles* free. *Grain* ovoid, acute, terete, free.—Species 1 or 3?, Trop. Asia, Africa, Australia.

C. lappacea, *Desv. in Nouv. Bull. Soc. Philom.* ii. (1810) 189. & *in Journ. Bot.* i. (1813) 70; *Beauv. Agrost.* 69, t. 14, f. 7; *Kunth Revis. Gram.* i. 317, t. 70, *Enum. Pl.* i. 366, *Suppl.* 302; *Steud. Syn. Gram.* 116; *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Ceyl. Pl.* 109; *Wall. Cat.* n. 3826; *Griff. Notul.* iii. 62, *Ic. Pl. Asiat.* t. 152, f. 1; *Miq. Fl. Ind. Bat.* iii. 398; *Benth. Fl. Austral.* vii. 640; *Hochst. in Bot. Zeit.* (1857) 33; *Lisboa in Journ. Bomb. Nat. Hist. Soc.* vii. (1893) 388. C. latifolia, *Trin. Fund. Agrost.* 141. C. parviflora, *Anderss. in Peters. Reise Mosamb. Bot.* 559. Hierochloa? latifolia, *Kunth Revis. Gram.* i. 21. Holcus latifolius, *Osbeck. Iter.* 247; *Linn. Syst. Ed.* x. 1305. Oplismenus? magellanicus, *Roem. & Sch. Syst.* ii. 485. Melica lappacea, *Rasp. in Ann. Sc. Nat. Ser.* I. v. (1825) 443. M. diandra & refracta, *Roxb. Fl. Ind.* i. 327. Poa latifolia, *Forst. f. Prodr.* 8; *Vahl Symb.* ii. 18. P. malabarica, *Linn. Sp. Pl.* 69; *Burm. Fl. Ind.* 27, t. 11, f. 2. P. nemoralis, *Heyne ex Wall. Cat.* n. 3826 A. Torresia? latifolia, *Beauv. l. c.* 165. T. biflora, *Roem. & Sch. Syst.* ii. 515. Uniola lappacea, *Trin. in Act. Petrop.* VI. i. (1831) 358, *Sp. Gram. Ic.* t. 298. Cenchrus lappaceus, *Linn. Sp. Pl. Ed.* II. 1488. Festuca latifolia, *Roth. Nov. Pl. Sp.* 75. F. blepharophora, *Roem. & Sch. Syst.* ii. 728. F. ciliaris, *Heyne ex Roem. & Sch. l. c.* F. ciliata, *Hb. Heyne ex Wall. Cat.* n. 3826 A. F. virgata, *Heyne ex Steud. Nom. Ed.* II. i. 633. Panicum festuciforme, *Hochst. Pl. Ind. Or. Hohenack.* n. 363.—Panicum, *Wall. Cat.* n. 8708.

Tropical Sikkim Himalaya, the Khasia Hills, Munnipore, Burma, Central India, and southward to Malacca, the Andaman Islds., and Ceylon.—Distrib. Malaya, China, Polynesia, Africa trop.

Stem 1–3 ft., stout, erect from a branched woody rootstock, with stout root-fibres. *Leaves* 4–10 by 1–1¼ in., many-nerved, glabrous or sparsely hairy, base narrow obtuse or subcordate, midrib oblique; sheath glabrous or hairy; ligule short, lacerate. *Panicle* 8–10 in. long and broad, branches smooth. *Spikelets* ⅛–¼ in., green; rachilla scaberulous; palea often decurrent on the rachilla below the gl.—The number of flg. gls. varies, but 5 is, I think, a normal; I and II are rather distant at the base. In one spikelet I find 6 gls., of which III was empty naked and epaleate, IV naked and paleate, V and VI with stout reversed tubercle-based spines; not unfrequently the fem. spikelet has only a single strongly-armed gl. and a produced rachilla. Kunth (l. c. Suppl. 302) describes gl. III and IV as complete and bisexual, V minute and imperfect. I suspect that this grass is polygamous.

112. **STREPTOGYNA,** *Beauv.*

A tall erect perennial grass. *Leaves* petioled, flat; nerves tessellate. *Spikelets* 1–4-fld., narrow, terete, subsessile, not jointed on the long, rigid, strict, unilateral spike; rachilla elongate and jointed between the fl. gls. *Glumes* 3–6, very narrow, I and II empty, persistent; I small, 3-nerved; II longer, convolute, acute, awnless, many-nerved; III longer, rigid, tightly convolute, many-nerved, acuminate and awned; IV–VI empty; palea embraced by the gl., narrow, 2-fid. *Lodicules* 3, subulate. *Stamens*

2–3. *Styles* filiform; stigmas 2–3, very long, at length spirally twisted. *Grain* linear, terete, free but closely embraced by the gl. and palea.

S. crinita, *Beauv. Agrostogr.* 80, t. 16, f. 8; *Poir. Encycl. Suppl.* t. 912; *Kunth Enum. Pl.* i. 427, *Suppl.* 349; *Doell in Mart. Fl. Bras.* ii. III. 171, t. 46; *Steud. Syn. Gram.* 339; *Griseb. Fl. Brit. W. Ind.* 528; *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Pl. Ceyl.* 110; *Wight Cat.* n. 2362. S. guianensis, *Rich. ex Roem. & Sch. Syst.* ii. 614. Streptia crinita & secunda, *Herb. Rich.*

TRAVANCORE; Courtallam, *Wight, Beddome.* CEYLON; Matele district, *Gardner.* **DISTRIB.** Africa and America trop.

Stem 4–6 ft., smooth. *Leaves* often as long as the stem, lanceolate, gradually narrowed to the base and apex, membranous; sheath long, open; ligule short. *Spikes* terminal, 8–16 in. long, with a spathiform basal sheath; rachis compressed, smooth, produced beyond the spikelets, with often an imperfect glume. *Spikelets* 1 in., quite smooth and glabrous; gls. subcoriaceous; I lanceolate, finely acuminate; III narrowed into the very slender awn, ½–¾ in. long. *Anthers* very long and narrow.

113. ÆLUROPUS, *Trin.* (*ex parte*).

Low much branched rigid leafy perennial grasses. *Leaves* distichous, usually spreading and convolute, rigid and pungent, rarely flat. *Spikelets* 6– many-fld., sessile or subsessile in oblong spiciform panicles or capitate, densely crowded, laterally compressed, villous, not jointed on their pedicels; rachilla jointed at the base and between the flg. gls. internodes very short. *Glumes* many, oblong, membranous, dorsally rounded, apiculate cuspidate or mucronate, I and II shorter than the flg. gls., I 1–3-nerved; II 5–7-nerved; fl. gls. closely imbricate, 7–9-nerved, longer than the empty gls.; palea as long and broad as its gl., broader upwards, truncate, keels ciliate. *Lodicules* 2, obliquely truncate. *Stamens* 3, anthers small. *Styles* free, stigmas plumose. *Grain* ovoid to oblong, free.—Species few, Reg. Mediter., Oriental and Indian.

Parlatore (Fl. Ital. i. 462) has, under *Æl. littoralis*, pointed out that two plants have been referred to *Æ. lævis*, Trin., namely, *Dactylis brevifolia*, Koen., and *D. littoralis*, Willd. The former of these is an Indian species, on which alone Trinius founded the genus, the latter being subsequently referred to it by Steudel (Nom. Ed. II. i. 30); but Parlatore was not aware of *D. brevifolia* being a species of *Eleusine*, and that therefore *Æluropus*, Trin., has no foundation. That this is so is evidenced both by Trinius's citation of Koenig's plant by name as his *lævis*, and by his figure of the fruit (Agrost. Fund. t. 12), which is conclusive. It would, however, appear from C. A. Meyer (Verz. Pfl. Cauc. 18 (1831) that Trinius may have included both *D. brevifolia* and *littoralis* under his *A. lævis*; for that author, quoting no doubt from the St. Petersburgh Herbarium, cites *lævis* and *villosus* as species of Trinius, giving (by error) *D. littoralis* as the authority for *lævis*, and *Poa repens*, Bieb., for *villosus*. Under these circumstances it appears to me that the best course to adopt, is to retain *Æluropus* as "Trin. ex parte," for *D. littoralis* and other plants described by later authors under that generic name. The alternatives are either to coin a new name for the latter, or to adopt for these *Calotheca*, Spreng. (Syst. i. 342 (1825), which is a mixture of several genera, including *Æluropi*, and which name is better avoided, inasmuch as there is an earlier *Calotheca* (Desv. 1810), likewise made up of several genera of grasses. It remains to say that the synonyms of *Eleusine brevifolia* (see p. 295), and of *Æluropus littoralis* and *villosus* are almost inextricably involved; and I am far from being satisfied with my attempt to disentangle the first and last of them.

Æ. villosus, *Trin. ex C. A. Mey. Verz. Pfl. Cauc.* 18; spikelets in short heads. *Aitchis. Cat. Panjab. Pl.* 169. Æ. arabicus, *Steud. Nom. Ed.* II. i. 30. Æ. brevifolius, *Wall. Cat.* n. 8897; *Wight Cat.* n. 1792 (*non Herb. Wight & excl. Syn.* Dactylis brevifolia, *Linn.*); *Duthie Grass. N.W. Ind.* 39. Æ. concinnus & siniacus, *Fig. et Notar. in Mem. Acad. Torin. Ser.* II. xii. (1852) 257. Æ. lagopodioides, *Trin. ex Thw. Enum. Pl. Zeyl.* 374. Æ. lagopoides, *Trin. ex Trim. Cat. Ceyl. Pl.* 110. Æ. littoralis, *var.* repens, *Coss. & Dur. Expl. Sc. Alger.* 155; *Boiss. Fl. Orient.* v. 594. Æ. mucronatus, *Aschers. in Schweinf. Beitr. Fl. Æthiop.* 297; *Boiss. l. c.* 595. Æ. niliacus, *Steud. Nom. Ed.* II. i. 30. Æ. niloticus, *Edgew. in Journ. Linn. Soc.* vi. (1862) 196. Æ. pubescens, *Trin. ex Steud. l. c. in part?* Æ. pungens, *C Koch. in Linnæa,* xxi. (1848) 408. Æ. repens, *Parl. Fl. Ital.* i. 462; *Edgew. l. c.* Dactylis lagopodioides, *Dalz. & Gibs. Bomb. Fl.* 298 (*excl. Syn.*). D. lagopoides, *Linn. Mant.* 33; *Burm. Fl. Ind.* 28, t. 12, f. 2 (*the right hand portion*), *Roxb. Fl. Ind.* i. 340; *Grah. Cat. Bomb. Pl.* 236 (*excl. Syn.*). D. massaviensis, *Steud. Syn. Gram.* 298. D. repens, *Desf. Fl. Atlant.* i. 79, t. 15. Poa lagopodioides, *Kunth Revis. Gram.* i. 111, *Enum.* i. 325. P. massavensis, *Fresen. in Mus. Senkenb.* ii. (1837) 143. P. repens, *Bieb. Fl. Taur. Cauc.* iii. 69. P. tunetana, *Spreng. Pugill.* ii. 20. Calotheca arabica, niliaca & repens, *Spreng. Syst. Veg.* i. 347, 348. *Duthie l. c.* (*err. typ.* miliacea). Kœleria lagopodioides, *Panz. in Denkschr. Acad. Muench.* K. brevifolia, *Herb. Wight ex Wall. Cat.* n. 8897 C. Sesleria lagopodioides, *Spreng. Pugill.* ii. 22. Festuca mucronata, *Forsk. Fl. Ægypt. Arab.* 22. F. pungens, *Vahl Symb.* i. 10, t. 2. Uralepis? pungens, *Kunth Revis. Gram.* i. 108, *Enum.* i. 319.

Sandy shores of the DECCAN PENINSULA and CEYLON. Salt plains of the PANJAB and SCIND.—DISTRIB. Reg. Mediterr., Arabia, Persia, Affghan., Reg. Casp.

A rigid perennial herb, with long wiry roots. *Stems* 6–12 in., densely tufted, branched, hard, smooth, erect, or prostrate with long often creeping stolons, base slightly swollen, clothed with rigid glabrous or hairy sheathing scales, above clothed with leaves, and terminating in a naked glabrous or pubescent slender peduncle 1–4 in. long. *Leaves* $\frac{1}{6}$–1 in., erect or spreading and recurved, subulate-lanceolate or acicular, coriaceous, pungent, convolute, rarely flat, striated with close-set nerves, base rounded, glabrous or sparsely hairy, midrib obscure, margins smooth or scaberulous; sheaths short, terete, inflated or dilated, glabrous or ciliate; ligule a ridge of short hairs. *Heads* $\frac{1}{4}$–$\frac{2}{3}$ in. diam., globose ovoid or oblong. *Spikelets* $\frac{1}{15}$–$\frac{1}{10}$ in., 4– many-fld., crowded, sessile, villous with soft hairs, pale green or white; gls. closely imbricate, ovate-oblong, apiculate, concave, margins hyaline, nerves strong; I 3–5-nerved; II longer, 7–9-nerved; flg. gls. rather longer than the empty, many-nerved, lower 2–4 sometimes neuter; palea broadly truncate or 3-lobed, keels villous. *Ovary* obovoid. *Grain* $\frac{1}{40}$ in., obovate-oblong, compressed dorsally.—A very variable grass in habit, foliage and size of the heads and spikelets. Regarded by Cosson and others as a form of *Æ. littoralis,* in which the panicle is elongate.

114. **DACTYLIS,** *Linn.*

Stiff erect tufted perennial grasses. *Leaves* flat. *Spikelets* 3–10-fld. compressed, subdistichously crowded in short unilateral spikes forming a terminal unilateral panicle, not jointed at the base; rachilla continuous, glabrous. *Glumes* I and II unequal, scarious, lanceolate, acuminate or mucronate, keeled, empty, persistent; I 1-nerved, II 1–3-nerved; flg. gls. rather longer, rigid, 5-nerved, subaristate, keel scabrid; palea 2-fid, keels ciliolate. *Lodicules* 2, 2-lobed, fleshy. *Stamens* 3, anthers long. *Styles* free, terminal, stigmas plumose. *Grain* oblong, acute, trigonous, dorsally

subcompressed, ventrally channelled, glabrous.—Species few, Europe temp. Asia and Africa.

D. glomerata, *Linn. Sp. Pl.* 86; leaves keeled, sheaths compressed, ligule long laciniate, panicle erect or inclined, branches short or the lower long erecto-patent naked below, spikelets 3–5-fld., keels of flg. gls. ciliate-scabrid. *Beauv. Agrost.* 85, t. 17, f. 5; *Fl. Dan.* t. 743; *Host Gram. Austr.* ii. 67, t. 94; *Kunth Enum. Pl.* i. 386, *Suppl.* 320, t. 29, f. 1; *Engl. Bot.* t. 335; *Knapp Gram. Britt.* t. 62; *Reichb. Ic. Fl. Germ.* t. 59 (*excl.* f. 1520); *T. Nees Gen. Fl. Germ. Monocot.* i. n. 65; *Webb. Phytog. Canar.* t. 249; *Wall. Cat.* n. 8899; *Duthie Grass. N.W. Ind.* 39; *Ledeb. Fl. Ross* iv. 355; *Boiss. Fl. Orient.* v. 596. Festuca glomerata, *All. Fl. Pedem.* ii. 252.

North-Western Himalaya from Kashmir to Kumaon, and Western Tibet, alt. 8–10,000 ft.—Distrib. Europe, N. Africa, W. and N. Asia (an alien elsewhere).

Stem 2–3 ft. from a short creeping stock, smooth. *Leaves* subglaucous, glabrous or hairy towards the base, margins scabrid; sheath much flattened or 2-edged. *Panicle* 1–6 in., strict, green or purplish; lower branches sometimes 2–3 in. long. *Spikelets* $\frac{1}{6}$–$\frac{1}{4}$ in., ovate; gls. I and II pale with green nerves, subaristately acuminate, terminal flg. gl. sterile.—There are many synonyms of this common variable European plant, but the whole genus must be studied before the species can be disentangled.

115. **SCLEROCHLOA,** *Beauv.*

A small annual prostrate grass. *Spikelets* minute, 3–6-fld., compressed, biseriately crowded on the branches of a secund subspiciform panicle; rachilla thickened under the flg. gls. *Glumes* 5–8; I and II very unequal, membranous, concave, emarginate, empty, persistent, I 3-nerved; II 5–8-nerved, unequal-sided; fl. gls. larger, complicate, keeled, strongly 5-nerved, tip obtuse, margins hyaline; palea hyaline, 2-fid, keels spinulosely ciliate. *Lodicules* 2, hyaline, ovate, 2–4-toothed. *Stamens* 3. *Styles* short, free, stigmas plumose. *Grain* oblong, free, subconcavo-convex, glabrous, tip 2-fid.

S. dura, *Beauv. Agrost.* 98, t. 14, f. 4; *Reichb. Ic. Fl. Germ.* t. 58; *Ledeb. Fl. Ross.* iv. 367; *Boiss. Fl. Orient.* v. 635; *Griseb. in Goett. Nachr.* (1863) 293. Poa dura, *Scop. Fl. Carn.* i. 70; *Host Gram. Austr.* ii. 53, t. 73. Sesleria dura, *Kunth Revis. Gram.* i. 110, *Enum. Pl.* i. 323, *Suppl.* 278. Cynosurus durus, *Linn. Sp. Pl.* 72; *Pollich Hist. Palat.* i. 98, *Fig.* 1. Eleusine dura, *Lamk. Illust.* i. 203. Festuca dura, *Vill. Hist. Pl. Dauph.* ii. 94. Amblychloa dura, *Link in Linnæa,* xvii. (1843) 399.

Kashmir Valley, alt. 5000 ft., *Thomson.*—Distrib. Europe, N. Asia.

Stems 4–6 in., tufted, compressed, leafy throughout. *Leaves* linear, acute; sheath open; ligule oblong. *Panicle* 1–2 in., ovate-oblong, rigid, green; pedicels very short, stout, trigonous. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., spreading or appressed to the rachis; gl. I ovate-oblong, obtuse, keeled, margins hyaline; II twice as long; flg. gls. ovate-oblong, herbaceous, compressed above; palea shorter, oblong.

116. **SCHISMUS,** *Beauv.*

Small annual grasses. *Leaves* narrow. *Spikelets* many-fld., in a subspiciform panicle, with very short erect branches and pedicels, not jointed

at the base; rachilla elongate, jointed at the base and between the flg. gls. *Glumes* 6–10; I and II large, empty, subequal, lanceolate, acute, concave, persistent, herbaceous, margins scarious, I broadest, 5–7-nerved; II 3-nerved; flg. gls. much shorter, oblong or obovate, 2-fid, many-nerved, mucronate or not between the hyaline lobes; palea spathulate with 2 submarginal diverging basal nerves. *Lodicules* 2, hyaline, truncate. *Stamens* 3, anthers minute. *Styles* terminal, long, stigmas plumose. *Grain* minute, broadly obovoid, compressed, free.—Species 2 or 3, Europ. Asia, N. Africa.

S. marginatus, *Beauv. Agrost.* 74, t. 15, f. 4; *Kunth Enum. Pl.* i. 385, *Suppl.* 318, t. 28, f. 2; *Ledeb. Fl. Ross.* iv. 403; *Duthie Grass. N.W. Ind.* 39. S. calycinus, *C. Koch in Linnæa* xxi. (1848) 397; *Coss. & Dur. Expl. Sc. Alger.* 138, in *Bull. Soc. Bot. Fr.* iv. (1857) 399; *Boiss. Fl. Orient.* v. 599. S. hirsutus, *Trin. Fund. Agrost.* 148. Festuca calycina, *Loefl. It. Hispan.* 116; *Cav. Ic.* i. 88, t. 44, f. 2; *Lamk. Illustr.* t. 46, f. 5. Koeleria calycina, *DC. & Duby. Bot. Gall. Suppl.* 271. Hemisacris gonatodes, *Steud. in Flora*, xii. (1829) 490. Electra calycina & nitida, *Panz. in Muench. Denkschr.* iv. (1813) 299 *cum Ic.* Trisetum Loeflingianum, *Duthie Grass. N.W. Ind.* 31 (*non Beauv.*).—*Griff. Notul.* 96 (gramen pusillum, &c.), *Ic. Pl. Asiat.* t. 154, f. ii.

UPPER PUNJAB; Peshawur, *Stewart.* WESTERN TIBET, alt. 9–11,000 ft., Nubra and Dras, *Thomson*, Iskardo, *Clarke.*—DISTRIB. Westwd. to the N. Atlantic, N. Asia.

Stems 2–8 in., densely tufted, filiform. *Leaves* glabrous or sparsely hairy, $\frac{1}{10}$ in. broad; ligule of hairs. *Panicle* 1½–2 in., green, glistening, pedicels scabrid. *Spikelets* ¼ in.; gl. I and II glabrous; flg. gls. hairy, cleft to about ¼ of their length; lobes ovate, acute.

117. **BRIZA,** *Linn.*

Annual or perennial erect grasses. *Leaves* flat or convolute. *Spikelets* many-fld., laterally compressed, pendulous, in lax rarely contracted or spiciform panicles not jointed on the pedicel; rachilla jointed at the base. *Glumes* many, scarious, cymbiform or saccate, closely imbricate; I and II subequal, empty, 3–5-nerved, persistent; fl. gls. broader, obtuse acute or shortly awned, 5- or more-nerved, terminal often empty or imperfect; palea often small, broad, flat, hyaline, 2-nerved. *Lodicules* 2, ovate-lanceolate. *Stamens* 3. *Styles* free. *Grain* ovoid, dorsally compressed, closely invested by the palea.—Species about 10, of temperate regions.

B. maxima, Linn., has been found as an escape in several parts of India. It may be recognized by the very large spikelets. *B. minor*, L., with very small spikelets may be also expected to occur.

B. media, *Linn. Sp. Pl.* 70; perennial, panicle erect, branches spreading, spikelets ovate 5–9-fld., gl. I and II shorter than III. *Fl. Dan.* t. 258; *Host Gram. Austr.* ii. t. 29; *Knapp. Gram. Britt.* t. 60; *Engl. Bot.* t. 340; *Trin. Sp. Gram. Ic.* t. 291; *Reichb. Ic. Fl. Germ.* i. t. 92; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 59; *Kunth Enum. Pl.* i. 371, *Suppl.* 307, t. 25, f. 2; *Ledeb. Fl. Ross.* iv. 365; *Boiss. Fl. Orient.* v. 592; *Duthie Grass. N.W. Ind.* 39.

WESTERN HIMALAYA; from Kashmir to Garwhal, and WESTERN TIBET, alt. 9–13,000 ft. SIKKIM, at Guatong, *Cummins.*—DISTRIB. Europe, N. Asia. (An alien elsewhere.)

Stem 1–3 ft., very slender, creeping below and stoloniferous. *Leaves* flat, smooth or scaberulous; sheaths smooth, upper inflated; ligule short. *Panicle* pyramidal; branches long, capillary, horizontal. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., green or purplish, shining, orbicular-ovate; fl. gls. cordate, imbricate.

118. **POA,** *Linn.* (by O. Stapf).

Annual or perennial grasses. *Leaves* flat or convolute. *Spikelets* 2–6-fld., in lax or close rarely spiciform panicles, laterally compressed; rachilla jointed at the base and between the flg. gls., glabrous or sparsely hairy, upper fl. usually imperfect. *Glumes* 4 or more, acute or obtuse, usually thinly herbaceous; I and II empty, persistent, 1–3-nerved, keeled; flg. gls. obtuse or acute, 5–7- very rarely 3-nerved, nerves conniving towards the top, callus often bearded with long wool; palea shorter than the gls., 2-keeled. *Lodicules* 2. *Stamens* 3. *Styles* short, free, stigmas plumose. *Grain* ovoid oblong or linear, free or adherent to the palea. —Species about 80, temperate and cold regions, rarely tropical.

The Indian *Poae* have been worked up by Dr. Stapf, who has kindly given me his mss., from which the characters given below are taken. The nomenclature agrees closely with that of Hackel in a very extensive series of North Indian grasses collected by Mr. Duthie. The names of early distributed collections including those of Dr. Thomson and myself were given by Genl. Munro after a cursory examination, and should be disregarded.

Subgen. I. PSEUDOPOA, *C. Koch. Fl. gls.* 3-nerved, often very faintly.

1. **P. persica,** *Trin. in Mem. Acad. Sc. Petersb. Ser.* VI. i. (1831) 373; *Kunth Enum. Pl.* i. 358; *Boiss. Fl. Orient.* v. 610; *Steud. Syn. Gram.* 255. P. parvula, *Herb. Un. Itin. ex Steud. l. c.* P. pamphylica, *Boiss. Diagn. Ser.* I. xiii. 58. Nephelochloa persica, *Griseb. in Ledeb. Fl. Ross.* iv. 366, *in Goett. Nachr.* (1868) 74. Festuca persica, heptantha, & polygama, *C. Koch in Linnæa,* xxi. (1848) 409, 410. F. Amherstiana, *Royle Ill. Himal. Bot.* 417 (*name only*).—Poa, n. 19, 20, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA; from Kunawur to Kashmir and WESTERN TIBET, alt. 7–12,000 ft.—DISTRIB. Westwd. to Asia Minor, Soongaria, Altai Mts.

A very slender erect, quite glabrous, usually flaccid annual, 1–18 in. high, most variable in habit; from a simple capillary stem with few-fld. contracted panicle, to a tall strict herb, with a pyramidal or oblong copiously branched panicle 6–8 inches long, and sometimes 6 in. across the spreading branches. *Leaves* narrowly linear, rarely $\frac{1}{6}$ in. diam., quite smooth, flat; ligule lanceolate. *Panicle-branches* 2–9 in a whorl, pedicels capillary, often very long and divaricate. *Spikelets* $\frac{1}{10}$-$\frac{1}{6}$ in. long, 2–15-fld., green, rachilla slender; gls. I and II lanceolate, acuminate, I very small, II 3-nerved; flg. gls. longer than II, linear-oblong, acute acuminate or obtuse and mucronate, smooth or obscurely puberulous, tip and margins more or less broadly scarious and shining; palea 2-toothed, keels scaberulous. *Lodicules* ovate-oblong. *Anthers* minute. *Grain* narrow, linear, subadherent.

The following are divergent forms with many intermediates of this extremely variable grass. In India they do not seem to affect special localities. All seem to occur in Western Tibet, where the plant is very abundant.

P. PERSICA *proper*; rather tall, spikelets many-fld., fl. gls. acute or acuminate very narrowly scarious.

Var. *soongarica*; spikelets 1–3-fld., flg. gls. acuminate, margins broadly scarious. var. oxymeris, *Boiss. Fl. Orient. l. c.* P. soongarica, *Boiss. l. c.* 611. P. paradoxa & P. subtilis, *Kar. & Kir. in Bull. Soc. Nat. Misc.* (1841) 464, (1842) 532. P. diaphana (error for *diaphora*), *Trin. in Bull. Sc. Acad. Petersb.* i. (1836) 69.

Nephelochloa altaica & soongarica, *Griseb. in Ledeb. Fl. Ross.* iv. 367. Glyceria soongarica, *Schrenk in Fisch. & Mey. Enum. Pl. Schrenk.* i. 1. Aira altaica, *Trin. in Bunge Verz. Suppl. Fl. Altaic.* 8.

Var. *alpina*, Boiss. l. c. 610; 1–2 in. high, fastigiately branched, panicle depressed amongst the leaves, rachis short, branches crowded spreading subsquarosely and decurved, spikelets 2–3-fld. fl. gl. acute. *Var.* minor, *Boiss. in Bourg. Pl. Lycia* (1860).

Var. ***major***, Boiss. l. c.; tall, panicle spreading, spikelets few or many-fld., flg. gls. truncate or rounded at the tip mucronate, margins very narrowly scarious. Nephelochloa tripolitana, *Boiss. & Blanch. Diagn. Ser.* II. iv. 133.

Subgen. II. EUPOA. *Flg. gls.* 5-nerved, lateral pairs sometimes obscure.

* Stem bulbously thickened at the base.—§ Arenariæ.

2. **P. bulbosa,** *Linn. Sp. Pl.* 70, *var.* elanata, *Stapf*; densely tufted, leaves linear acute flat, ligule ovate or oblong, panicle oblong, lower branches binate, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. 4–7-fld. subsessile crowded often viviparous, gl. I ovate acute margin broadly hyaline, flg. gls. oblong acute, upper $\frac{1}{4}$–$\frac{1}{3}$ hyaline silkily hairy below the middle, nerves obscure, wool 0 or very scanty, keels of palea scabrid. P. bulbosa, *Duthie Grass. N.W. Ind.* 40; *Griseb. in Goett. Nachr.* (1868) 74.

WESTERN HIMALAYA; from Kashmir to Zanskar, alt. 5–9000 ft., *Falconer*, &c. WESTERN TIBET, alt. 9–13,000 ft.—DISTRIB. (of *P. bulbosa*) temp. Europe and Asia.

Stems 6–16 in., terete, smooth. *Leaves* chiefly subradical, margins smooth, shortly acute, lower 2–2$\frac{3}{4}$ in., upper much shorter, $\frac{1}{6}$ in. broad, of the surculi very narrow; sheaths lax, often open, upper more appressed shorter than the internodes; ligule $\frac{1}{8}$–$\frac{1}{6}$ in., or shorter in reduced forms. *Panicle* 1–2 in., rarely ovate, lobed, contracted, lower branches nearly smooth; branchlets short, scaberulous. *Spikelets* shortly pedicelled or subsessile, oblong or ovate-oblong, pale green; gl. I $\frac{1}{12}$–$\frac{1}{8}$ in., ovate, acute, 3- rarely 2-nerved, margins denticulate, nerves rough; II similar but larger, more acuminate, 3-nerved; fl. gls. $\frac{1}{8}$–$\frac{1}{7}$ in., oblong, acute, sometimes mucronulate, upper $\frac{1}{4}$-$\frac{1}{3}$ hyaline; nerves obscure; palea $\frac{1}{5}$ shorter. *Anthers* $\frac{1}{18}$–$\frac{1}{12}$ in.—Differs from typical *bulbosa* in the absence or scantiness of wool in the spikelets. Kashmir specimens are unusually tall and stout, with many broad leaves and sometimes a laxer habit. Zanskar ones are typical in all respects but the absence of wool. The viviparous state is very common.

** Stem not bulbously thickened at the base.

† Spikelets broadly ovate; gls. thin, broad, dorsally strongly arched, fl. gl. base silkily hairy, wool 0.—§ Alpinæ.

3. **P. alpina,** *Linn. Sp. Pl.* 67; densely tufted, surculi clothed with short distichous thickish sheaths, leaves short broadly linear firm acute, panicle broadly ovate, lower branches mostly binate, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. 3–6-fld. broadly ovate, gls. all thin arched, I ovate acute margin broadly hyaline, flg. gls. ovate-oblong obtuse upper $\frac{1}{3}$ hyaline silky-hairy below the middle nerves obscure, wool 0, keels of palea ciliate below the middle. *Host Gram. Austr.* ii. 49, t. 67; *Engl. Bot.* t. 1003; *Knapp Gram. Britt.* t. 50; *Reichb. Ic. Fl. Germ.* t. 83; *Ledeb. Fl. Ross.* iv. 370; *Boiss. Fl. Orient.* v. 605; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 40.

WESTERN HIMALAYA and WESTERN TIBET; from Kashmir to Garwhal, alt. 10–16,000 ft.—DISTRIB. N. temp. and Arctic regions.

Stem 4–16 in., terete, smooth. *Leaves* chiefly crowded at the base of the stem; rarely more than $\frac{1}{6}$ in. broad, flat or of the surculi plicate, firm, margins rough; lowest sheaths and of the surculi distichous, the thickened bases enclosing the stem, upper

much longer, up to 2–4 in., smooth, open or not, uppermost remote from the panicle; ligule of the lower and of the surculi very short, truncate, ciliolate, of the upper longer, ovate, sparingly coarsely denticulate. *Panicle* up to $2\frac{1}{2}$ by 2 in., lax or dense, lower branches more or less spreading, usually naked in the lower half; branchlets short, scaberulous. *Spikelets* crowded, usually parti-coloured, the lower shortly upper longer-pedicelled; gls. thin, I $\frac{1}{7}$ in., 3-nerved, lateral nerves faint or one obsolete, margins subentire, keel rough; II similar, but rather broader; fl. gls $\frac{1}{8}$–$\frac{1}{7}$ in., often emarginate; palea hardly shorter, keels ciliate below the middle, serrulate above it. *Anthers* $\frac{1}{16}$ in., oblong.

†† Spikelets narrower, gls. all or flg. especially firmer, I and II lanceolate or oblong-lanceolate.

a. Gls. all firm; I & II acute or subacuminate, I 1- *or sub* 3-*nerved; anthers* $\frac{1}{18}$–$\frac{1}{12}$ *in.—Rather tall robust or subrobust species, stoloniferous when flg.; stems smooth.*—§ Pratenses.

4. **P. tibetica,** *Munro ex Duthie Grass. N.W. Ind.* 41; tall, stout, stoloniferous, leaves linear acute firm, ligule short truncate, panicle contracted or spiciform, lower branches 2–4-nate unequal smooth, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. 4–6-fld. pedicelled crowded pale, gl. I ovate-lanceolate margin hardly hyaline, II ciliate on the margins towards the base, fl. gls. oblong, tips only hyaline, keel alone silkily hairy, lateral nerves obscure, wool 0.

WESTERN TIBET, alt. 9–16,000 ft.; Piti, *Jacquemont*; saline plains of Ladak, &c., *Thomson*. PLAINS OF TIBET N. of Kumaon, alt. 15,000 ft., *Strachey & Winterbottom* (Poa, n. 1.)

Stem 12–20 in., stout, terete, smooth, closely sheathed below, 1–2-leaved much below the panicle. *Leaves*, lower 8 in., upper 2–3 by $\frac{1}{8}$–$\frac{1}{5}$ usually plicate, glabrous, smooth; sheaths firm, upper very long, smooth; ligule $\frac{1}{12}$ in., firm, ciliolate. *Panicle* about $1\frac{1}{4}$ in. long, narrow, interrupted; lower branches 2-nate, the longer appressed to the rachis, and branchlets smooth. *Spikelets* crowded, all pedicelled, oblong, pale; gls. firm, I $\frac{1}{8}$–$\frac{1}{7}$ in., subacuminate, sub 3-nerved, keel minutely scaberulous, margins hardly hyaline; II rather larger, more oblong; fl. gls. $\frac{1}{7}$–$\frac{1}{6}$ in., subacute, ciliate on the margin towards the base, lateral nerves obscure; palea rather shorter, keels subserrulate. *Anthers* $\frac{1}{10}$ in., linear.

Var. *aristulata*, Stapf; gls. more acuminate often very shortly aristulate.—Eastern Tibet, N. of Sikkim, alt. 16–17,000 ft.—*J. D. H.*

5. **P. pratensis,** *Linn. Sp. Pl.* 67; tall, stout, stoloniferous, leaves usually flat acute upper much the shortest, ligule truncate or subobovate, panicle ovate or oblong lower branches usually 5-nate, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. 3–5-fld. ovate acute crowded green, gl. I ovate-lanceolate acute, flg. gls. oblong upper $\frac{1}{5}$–$\frac{1}{6}$ hyaline nerves prominent, keel and lateral nerves silkily hairy to the middle or above it, wool copious, keels of palea scabrid-serrate.—*Host Gram. Austr.* ii. 44, t. 61; *Engl. Bot.* t. 1073; *Knapp Gram. Britt.* t. 55; *Kunth Enum. Pl.* i. 352, *Suppl.* 297; *Steud. Syn. Gram.* 251; *Reichb. Ic. Fl. Germ.* t. 88; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 56; *Ledeb. Fl. Ross.* iv. 378; *Boiss. Fl. Orient.* v. 601; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 40. P. alpina, *Griseb. l. c.* (*Herb. Schlagintw.* n. 2772.)

WESTERN HIMALAYA; from Kashmir to Kumaon, and WESTERN TIBET, alt. 5–15,000 ft. BHOTAN, *Griffith.*—DISTRIB. North temp. regions.

Stems 6–20 in., smooth, terete. *Leaves* crowded at the base of the stem, linear, rarely plicate or subinvolute, firm (flaccid in shade), margins asperulous, glabrous or rarely sparsely hairy, lower very variable in length, upper $\frac{1}{3}$–1 in. by $\frac{1}{20}$–$\frac{1}{6}$ in.; lowest sheaths firm, close; upper much longer, 4 in. and upwards, smooth; ligule rarely more

than $\frac{1}{12}$ in. *Panicle* up to 4½ in., lax or contracted; lower branches rarely 2–3-nate, erect or spreading, naked below or rarely branched to the base, smooth or asperulous. *Spikelets* shortly or terminal longer-pedicelled, green; gl. I $\frac{1}{12}$–$\frac{1}{10}$ in., 3- or 2–1-nerved, keel asperulous, margins hyaline denticulate; II rather larger, 3-nerved; gls. $\frac{1}{8}$–$\frac{1}{7}$ in., acute, nerves prominent; palea shorter. *Anthers* $\frac{1}{15}$–$\frac{1}{12}$ in. linear.—There are many forms, characterized by narrow almost setaceous or by very short leaves, by very narrow and contracted panicles, by shorter spikelets, or by various combinations of these characters; but these are all so intricately connected, and in many cases so evidently the product of conditions of habitat, and are so independent of geographical distribution, that it is impossible to define them satisfactorily. The two extreme forms are—

Var. *angustifolia*, Sm. Fl. Britt. i. 105; Gaud. Agrost. Helvet. i. 214; leaves extremely narrow often setaceous. P. angustifolia, *Linn. Sp. Pl.* 67. P. strigosa, *Hoffm.* & setacea, *Hoffm.* P. compressa & trivialis (*in part*) *Herb. Ind. Or. Hf. & T.*—Occurs with the type and passes directly into it.

Var. *alpigena*, Blytt Norg. Flora, 130; stem 3–8 in., leaves short plicate, ligule $\frac{1}{25}$–$\frac{1}{8}$ in., panicle $\frac{3}{4}$–1½ in. ovate, lowest branches solitary or 2–5-nate glabrous more or less flexuous spreading sometimes deflexed, branches sparingly asperulous or glabrous, spikelets 3–2-fld. variegated. P. bulbosa, *Herb. Strach. & Winterb.* n. 4. P. variegata, *Jacquem. mss.* P. alpina, *Herb. Ind. Or. Hf. & T.* (*in part*).—Western Tibet, alt. 13-17,700 ft., Topidhunga in Kumaon, alt. 14,500 ft., *Strach. & Winterb.*—A very distinct variety, with the habit of *P. alpina*, and confounded with it in various collections.

6. **P. pseudo-pratensis,** *Hook. f.*; stem tall stoloniferous, leaves acute or acuminate usually plicate lowest usually shortest, ligule ovate acute or truncate, panicle ovate or oblong lax-fld. lower branches usually binate branches very long flexuous scaberulous, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. 3–2-fld., gl. I ovate-oblong acute margin hardly hyaline, flg. gls. oblong tips alone hyaline base silkily hairy nerves prominent, wool scanty or 0, keels of palea ciliate below.—Festuca, *Wall. Cat.* n. 3798 (*partly*). P. pratensis & P. flexuosa? *Herb. Ind. Or. Hf. & T.* (*in part.*)

CENTRAL & EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim and W. Bhotan, alt. 10–12,000 ft., J. D. H., *Cummins.*

Stems 8–20 in., smooth, terete. *Leaves* crowded at the base of the stem, 1–3½ by $\frac{1}{8}$ in., lowest shorter, cauline far distant, of the surculi longer, linear, gradually narrowed into the sheath, glabrous smooth or minutely scaberulous; lowest sheaths short, firm, scarious, loose, upper much longer up to 6 in., membranous, smooth; ligule $\frac{1}{15}$ in. *Panicle* up to 8 in., branches 3–5-nate, about 2–3 in. long, naked except towards the ends, all spreading or suberect, flexuous, smooth or asperulous, branchlets rough. *Spikelets* $\frac{1}{4}$–$\frac{1}{3}$ in., blueish, crowded, shortly or the terminal longer-pedicelled, ovate-oblong; rachilla pilose; gls. firm, I $\frac{1}{7}$ in., 1-nerved, with rarely a lateral pair, keel roughish, margins minutely denticulate; II rather larger, more acuminate; fl. gls. $\frac{1}{6}$–$\frac{1}{5}$ in., oblong, acute, tip spotted with yellow, keel and outer nerves silky beyond the middle, intermediate at the base only; palea rather shorter, ciliate below, and scabridly serrulate above or in the whole length. *Anthers* $\frac{1}{15}$–$\frac{1}{12}$ in., linear.

β. Glumes all, or the flg. especially somewhat firm, I & II acuminate. I always distinctly 3*-nerved; anthers* $\frac{1}{25}$–$\frac{1}{12}$ *in.—Low or more often tall slender species, stems when flowering surrounded by buds or short stolons, or fascicled with longer stolons.*—§ Nemorales.

7. **P. attenuata,** *Trin. in Bunge Verz. Suppl. Fl. Alt.* 9; stems tufted erect rigid 1–2-leaved above, leaves narrowly linear plicate or involute, sheaths white scarious, ligule ovate, panicle contracted dense-fld., lower branches solitary or 2-nate short appressed scaberulous branching from

the base, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. 2–5-fld. subsessile, gl. 1 ovate-lanceolate acuminate margins narrowly hyaline, flg. gls. sparsely hairy below, wool 0 or scanty. *Ledeb. Fl. Ross.* iv. 371; *Boiss. Fl. Orient.* v. 608. P. attenuata & P. altaica, *Griseb. in Goett. Nachr.* (1868) 74. P. laxa, *Duthie Grass. N.W. Ind.* 40. P. laxa & trivialis *partim Herb. Ind. Or. Hf. & T.* P. flexuosa γ. humilis, *Herb. Royle.* P. sterilis, *Bieb. ex Duthie l. c.*

ALPINE HIMALAYA & WESTERN TIBET, alt. 13–17,000 ft.—DISTRIB. Persia, Turkestan, N. Asia.

Stems 4–6 in., densely tufted, not stoloniferous, bearing axillary surculi. *Leaves* 1–2 by $\frac{1}{15}$ in., firm, smooth or nearly so; lower sheaths mostly scarious, white, upper up to 2 in.; ligule $\frac{1}{12}$–$\frac{1}{7}$ in., acute. *Panicle* $\frac{3}{4}$–$1\frac{1}{2}$ in., strict, continuous or sub-interrupted, lower branches rarely 3-nate, $\frac{1}{2}$–$\frac{3}{4}$ in., erect, often stout. *Spikelets* green, often variegated; gls. close together, firm, I hardly $\frac{1}{8}$ in. 3-nerved, keel nearly smooth or roughish; II rather longer, broader in the middle; flg. gls. $\frac{1}{8}$ in., oblong, upper $\frac{1}{6}$ hyaline, minutely scaberulous, tip usually erose; nerves 5, slender, obscure, keel and outer nerves silky at the very base only or subglabrous, rarely with longer hairs; palea rather shorter, keels serrulately scabrid. *Anthers* $\frac{1}{16}$ in.—Griseback's *P. altaica* (Goett. Nachr. l. c.) is a stunted depauperate form.

8. **P. nemoralis,** *Linn. Sp. Pl.* 69; stem not stoloniferous when flg., but bearing at the base surculi or leaf-buds 2–4-leaved above the base smooth or scaberulous, leaves very narrowly linear, ligule very short ovate or longer and oblong, panicle contracted or open, lower branches usually binate usually branching to the base and branches scaberulous, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. long-pedicelled 2–4-fld., gls. crowded I ovate-lanceolate acuminate margins hyaline, flg. gls. oblong upper $\frac{1}{4}$ or $\frac{1}{3}$ hyaline nerves obscure and keel at the base silky-hairy, wool 0 or scanty, keels of palea scaberulous. *Fl. Dan.* t. 709; *Engl. Bot.* t. 1265; *Host Gram. Austr.* ii. 5, t. 71; *Reichb. Ic. Fl. Germ.* t. 86; *Steud. Syn. Gram.* 251; *Ledeb. Fl. Ross.* iv. 375; *Boiss. Fl. Orient.* v. 607; *Duthie Grass. N.W. Ind.* 40.

TEMPERATE & ALPINE HIMALAYA & WESTERN TIBET, alt. 5-15,500 ft.—DISTRIB. Europe, N. Asia, N. Am.

Stem 1–2 ft., erect, rigid or flaccid, smooth or scaberulous above, lower internodes hidden in the sheaths or nearly so, uppermost more or less exserted. *Leaves* cauline 2–5 by $\frac{1}{12}$ in., flat plicate or involute, firm or flaccid, erect or spreading, smooth or minutely scaberulous above; sheaths appressed, uppermost up to 4 in.; ligule truncate, up to $\frac{1}{8}$ in., often erosely denticulate. *Panicle* lax, rigid flexuous or flaccid, lowest branches solitary to 3-nate, slender, erect or spreading, asperulous. *Spikelets* loosely disposed, green or variegated; rachilla smooth scaberulous or pilose; gls. close or rather distant, firm or rather thin, I $\frac{1}{8}$–$\frac{1}{6}$ in., 3-nerved, keel roughish, margins narrowly or broadly hyaline; II rather longer and broader; flg. gls. $\frac{1}{8}$ in., subobtuse (or subacute in profile) upper $\frac{1}{6}$–$\frac{1}{4}$ hyaline and sometimes erose, nerves 5, slender, interspaces sometimes puberulous; palea rather shorter. *Anthers* $\frac{1}{16}$–$\frac{1}{10}$ in.—An extremely variable species in habit and length of ligule especially, which is usually short in European examples. The form with a long ligule forms a link with *P. attenuata*, Trin., which has usually a more contracted habit. Most of the described varieties of *nemoralis* are also Indian.

Var. *Linnæi*, Stapf; ligule very short about $\frac{1}{16}$ in. long.—From Kashmir to Kumaon, alt. 5–9000 ft., rarely higher.

Var. *ligulata*, Stapf; ligule elongate $\frac{1}{15}$–$\frac{1}{8}$ in. P. attenuata, *Griseb. in Goett. Nachr.* (1868) 75. (*Schlagintw.* n. 2791) & P. botryoides (*Schlag.* 7068, 7196). P. flexuosa, *Herb. Royle, & Strach. & Winterb.* n. 7. P. laxa, *Herb. Ind. Or. Hf. & T.* (*the Sikkim plant*). P. serotina, var. botryoides, *Griseb. l. c.* (*Herb. Schlag.* n. 7562). P. variegata, *Jacquem. mss.* (*partim*).—From Kashmir to Sikkim, alt. 7–15,000 ft.

γ. *Glumes all thin, I & II acute or subacute, I* 1-*nerved or with a very slender* 2*nd; anthers* $\frac{1}{12}$–$\frac{1}{8}$ *in.—Stem slender, densely cæspitose with fascicled basal surculi, or more loosely & stoloniferous; panicle slender, branches capillary.*—§ Glareosæ.

9. **P. polycolea,** *Stapf*; stems fascicled wiry smooth, leaves narrowly linear or subsetaceous, lower sheaths very lax white scarious, ligule very short, panicle contracted or effuse, lower branches 2–5-nate capillary, branchlets and pedicels long, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. loosely 3-fld., gl. I acute or subacute margins hyaline, flg. gls. oblong upper $\frac{1}{6}$–$\frac{1}{4}$ hyaline, nerves and keel sparsely silky hairy or glabrous, keels of palea minutely scabrid. P. serotina, *Herb. Strach. & Winterb.* n. 11. Poa n. 15, *Herb. Ind. Or. Hf. & T.*

Western Himalaya; from Kashmir to Kumaon, alt. 8–12,000 ft.

Stem 6–12 in., erect or ascending, rather strict, lowest internodes loosely sheathed, uppermost rather far exserted. *Leaves* lower 8 in., long-acuminate, flat or more or less convolute, subflaccid, glabrous, smooth or margins and nerves beneath asperulous; uppermost sheaths up to $3\frac{1}{2}$ in. *Panicle* $2\frac{1}{2}$–4 in., pyramidal, rigid or flaccid, lowest branches 2–3 in., flexuous, lower $\frac{1}{2}$ or $\frac{1}{3}$ naked, then loosely branched; branches rather long, roughish; pedicels of spikelets up to $\frac{1}{5}$ in. *Spikelets* loosely disposed, oblong, bright green or variegated; gls. thin, I $\frac{1}{8}$–$\frac{1}{6}$ in., lanceolate, 1-nerved, keel roughish; II longer, oblong, 3-nerved; flg. gls. $\frac{1}{4}$–$\frac{1}{5}$ in., acute or subacute; nerves slender, prominent or obscure, outer and keel glabrous or sparsely silky; wool 0 or hardly any; palea rather shorter. *Lodicules* unequally 2-lobed. *Anthers* $\frac{1}{12}$ in., linear.

10. **P. Falconeri,** *Hook. f.*; stem tall leafy, leaves narrowed from the middle scaberulous above and beneath, upper equalling or exceeding their sheaths, ligule ovate, panicle narrow very lax, lower branches binate, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. 2–3-fld., gl. I oblong-lanceolate acute, II subobovate-oblong, flg. gls. acute or subacute tip shortly hyaline, nerves obscure sparingly pubescent, wool 0, keels of palea finely serrulate.

Western Himalaya, *Falconer*; Garwhal, alt. 12–13,000 ft. *Duthie* (n. 288).

Stem 2–$2\frac{1}{2}$ ft., erect, smooth, terete, 4–5-leaved above the base; internodes short, or the upper more or less elongate and exserted. *Leaves* about 6 by $\frac{1}{6}$ in., subflaccid, linear, glabrous, flat or subplicate, upper about equalling their sheaths; lower sheaths lax, upper adpressed, firm, uppermost 3–6 in.; ligule $\frac{1}{12}$–$\frac{1}{8}$ in. *Panicle* about 4 in., narrow, very lax, flexuous and flaccid; lower branches flexuous, erect, sparingly and loosely again branched, smooth or nearly so, branchlets roughish. *Spikelets* as long as or shorter than their pedicels, oblong, green or purplish below, gls. thin, I $\frac{1}{6}$–$\frac{1}{5}$ in., 1-nerved, margin broadly hyaline, keel minutely asperulous; II rather longer, 3-nerved; flg. gls. $\frac{1}{5}$ in., oblong, nerves very slender, pilose on the side at the base only; palea rather shorter than the gl. *Lodicules* unequally 2-fid. *Anthers* about $\frac{1}{10}$–$\frac{1}{6}$ in.

11. **P. flexuosa,** *Wahlb. Fl. Carp.* 22, *Fl. Suec.* 57 (*ex parte*); stems usually very slender tufted stoloniferous, leaves narrowly linear acute or acuminate flat plicate or involute, cauline sometimes deflexed, panicle pyramidal lax, lower branches 2- rarely 3-nate or solitary, branches and pedicels scaberulous, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. 2–3-fld., gls. thin I oblong-lanceolate 1–3-nerved margin broadly hyaline, II rather longer, fl. gls. broadly oblong upper $\frac{1}{4}$ or $\frac{1}{5}$ hyaline base shortly silky-hairy, nerves obscure or slender and prominent, wool scanty or 0, keels of palea scabrid. *Reichenb. Ic. Fl. Germ.* t. 84; *Blytt Norg. Fl.* 126. ?P. cenisia, *Duthie Grass. N.W. Ind.* 40; ?*Griseb. in Goett. Nachr.* (1868) 75. P. cenisia, *var.* β. flexuosa, *Hartm.*

Handb. Skand. Fl. 262; *Anders. Gram. Skand.* t. 4, f. 41. P. flexuosa, var. *a.* effusa, *Herb. Royle.*—Poa No. 9, *Herb. Strach. & Winterb.*—Poa No. 7, & P. flexuosa (*of Sikkim*), *Herb. Ind. Or. Hf. & T.*)

ALPINE HIMALAYA, alt. 10–17,000 ft., from Kashmir to Sikkim.—DISTRIB. N. temp. and Arctic regions.

Stem 8–16 in., erect or with the branches geniculately ascending, smooth; lowest internodes short, laxly or closely clothed with short sheaths, the following 2-4 elongate, uppermost exserted. *Leaves* 2–5 by $\frac{1}{20}$ in., glabrous, smooth or nearly so, flaccid or rather firm; lower sheaths scarious, uppermost about 4 in.; ligule $\frac{1}{12}$–$\frac{1}{6}$ in., ovate. *Panicle* 2-4 in., erect or inclined; lower branches capillary, flexuous, often spreading or deflexed, naked except towards the tips smooth. *Spikelets* shortly or the terminal longer pedicelled, green, generally suffused with purple; gl. I $\frac{1}{8}$–$\frac{1}{7}$ in., sub-obtuse or -acute, margins broadly hyaline, keel smooth or roughish; II rather longer, ovate-oblong, sub-obtuse, 3-nerved, lateral nerves often short; flg. gls. $\frac{1}{6}$–$\frac{1}{5}$ in., nearly glabrous or keel and nerves at the base silky, smooth or minutely rough; palea rather shorter than the gl., dorsally most minutely puberulous between the keels. *Anthers* $\frac{1}{12}$–$\frac{1}{8}$ in., linear.

δ. *Glumes I & II thin, acute or acuminate, I 1-nerved, or with a very slender 2nd, rarely 3-nerved; anthers very minute, rarely* $\frac{1}{16}$ *in. long.—Usually perennial, sometimes flg. in the first year, or truly annual; leaves & often stem flaccid; stems loosely tufted or on a slender rhizome & with more or less elongate lower internodes, hardly stoloniferous when flowering.*—§ Micrantheræ.

‡ Ligule very short; keels of palea serrulately scabrid.

12. **P. khasiana,** *Stapf*; stem slender erect or ascending, leaves linear long-acuminate, ligule very short truncate, panicle narrowly pyramidal, lower branches 3–5-nate and branchlets scaberulous, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. 3–4-fld., gls. rather distant, I oblong-lanceolate acute margins very narrowly hyaline, II ovate-lanceolate, fl. gls. minutely granulate, nerves prominent base nearly glabrous, wool copious or scanty, keels of palea scabrid.—Poa himalayana & Poa n. 17, *Herb. Ind. Or. Hf. & T.*

SIKKIM HIMALAYA, alt. 11–14,000 ft., *J. D. H., King's Collector.* KHASIA HILLS, alt. 4–6000 ft., *J. D. H. & T. T., Clarke.*

Stems loosely tufted, 1–2 ft., suberect from a rooting base, internodes 5–6, upper gradually longer, loosely or rather tightly sheathed, or the upper shortly exserted. *Leaves* up to 4–6 by $\frac{1}{12}$–$\frac{1}{10}$ in., flaccid, flat, smooth or margins roughish; sheaths smooth, uppermost up to 5 in., usually longer than the blade; ligule erose. *Panicle* 4–6 in. long, lax, sometimes subsecund; lower branches subrigid or flexuous, slender, at length spreading or deflexed, unbranched except the tips or loosely branched almost from the base. *Spikelets* ovate-oblong, pale green; gls. firm; I $\frac{1}{8}$ in., 1-nerved, keel rough; II rather longer and broader, 3-nerved; flg. gls. $\frac{1}{8}$–$\frac{1}{7}$ in., oblong, obtuse, tip shortly hyaline, nerves 5 distant, keel and outer nerves sparsely silky or subglabrous. *Anthers* $\frac{1}{25}$–$\frac{1}{20}$ in.—Differs from *P. annua* var. *sikkimensis* in being taller, with leaves long-attenuate, ligule very short, branches of panicle 3–5-nate, in the wool, and in the keels of the palea not ciliate; and from *P. annua* var. *nepalensis*, in the 3–5-nate more flexuous branches, rather larger spikelets, narrower firmer gls. with more prominent nerves, rough keels of the palea and rather longer anthers.

‡‡ Ligule long; keels of palea ciliate.

1. *Spikelets obovate; gl. I & II equalling the flg. or rather shorter.*

13. **P. hirtiglumis,** *Hook. f.*; stem stout, lower internodes usually

short, upper elongate, lower sheaths lax scarious, leaves linear flat or plicate acute flaccid, panicle pyramidal, lower branches binate spreading or deflexed, spikelets $\frac{1}{6}$ in. obovate 2-fld., flg. gls. broadly oblong obtuse, base copiously silky-hairy, wool 0, keels of palea long-ciliate. P. alpina *partly*, & P. flexuosa, ??*partly Herb. Ind. Or. Hf. & T.*

Sikkim Himalaya, alt. 16-18,000 ft.; ?Lachoong Valley, alt. 11,000 ft., *J. D. H.*

Stems 8–12 in., from a slender evanescent rhizome, forming lax stoloniferous tufts with the surculi, smooth, terete; internodes mostly very short, the penultimate $= \frac{1}{4}$–$\frac{1}{3}$ the stem, uppermost up to 6 in., exserted. *Leaves* 2–3 by $\frac{1}{12}$–$\frac{1}{10}$ in., chiefly crowded towards the base of the stem, with 1–2 shorter higher up, or all short, glabrous, smooth with roughish margins; lower sheaths lax, scarious, upper up to 3 in., membranous, smooth; ligule $\frac{1}{12}$–$\frac{1}{10}$ in., ovate, obtuse. *Panicle* up to 2 in., lax, lower branches $1\frac{1}{2}$ in. shorter, naked for most of their length, smooth, branchlets roughish. *Spikelets* shortly or the terminal longer pedicelled, loosely disposed or the terminal crowded, green or suffused with violet, rachilla pilose; gls. firm, I $\frac{1}{7}$ in., acute, 1-nerved, keel roughish; II rather larger, acute, 3-nerved; flg. gls. rather longer than II, upper $\frac{1}{4}$ hyaline, nerves obscure. *Lodicules* unequally 2-lobed. *Anthers* $\frac{1}{2\frac{1}{5}}$ in., linear. *Grain* elliptic-oblong, laterally compressed.

2. *Spikelets ovate or oblong; gls. I & II distinctly shorter than the flg.*

14. **P. himalayana**, *Nees ex Steud. Syn. Gram.* 256; stem tall erect or ascending slender weak, leaves linear flat long-acuminate rather flaccid, ligule ovate or oblong, panicle contracted or effuse, lower branches 2- rarely 3–4-nate long capillary flexuous, spikelets $\frac{1}{8}$–$\frac{1}{5}$ in. 3–4-fld., gls. distant, gl. I lanceolate acuminate margin hardly hyaline, flg. gls. narrow tip alone hyaline, base scantily silky-hairy, keels of palea long-ciliate. *Duthie Grass. N.W. Ind.* 40.—Deschampsia, *Wall. Cat.* n. 8885.—Poa n. 18, *Herb. Ind. Or. Hf. & T.*

Temperate & Alpine Himalaya, from Kashmir to Bhotan, alt. 7–13,000 ft., *Royle*, *Wallich*, *Griffith*, &c.

Stems 12–18 in., loosely tufted, smooth, internodes 5–6, gradually longer upwards, mostly exserted. *Leaves* $1\frac{1}{2}$–3 by $\frac{1}{12}$–$\frac{1}{10}$ in., rarely broader, narrowly linear, roughish above, glabrous beneath; sheaths appressed, smooth, upper about 4 in.; ligule about $\frac{1}{12}$ in., ovate or oblong. *Panicle* up to 6 in., rather flaccid, very lax, rachis smooth; lower branches about 2 in., loosely forked at the tips only, branchlets roughish. *Spikelets* $\frac{1}{8}$–$\frac{1}{5}$ in., rather distant, oblong, pale green; gls. thin; I $\frac{1}{12}$–$\frac{1}{8}$ in., 1-nerved, keel roughish; II rather larger, 3-nerved, lateral nerves long; flg. gls. $\frac{1}{8}$–$\frac{1}{7}$ in., oblong, subobtuse; nerves 5, slender, elongate, sometimes prominent, outer pair & keel or the keel only silky-hairy, wool scanty. *Lodicules* minute, unequally 2-fid. *Anthers* about $\frac{1}{30}$ in., linear.

15. **P. tremula**, *Stapf*; stem rooting at the base ascending, leaves flat or of the surculi plicate acute flaccid, sheaths of upper largest, ligule oblong, panicle pyramidal, lowest branches solitary or binate, spikelets lax oblong $\frac{1}{5}$–$\frac{1}{4}$ in. 3–6-fld., gl. I oblong-lanceolate, II acuminate 3-nerved, flg. gls. with upper $\frac{1}{4}$ hyaline, wool rather copious, keels of palea shortly ciliate. P. altaica, *Munro in Herb. Jacquemont* (n. 277). P. nepalensis, & nemoralis, *Herb. Ind. Or. Hf. & T.* (*in part*). P. trivialis *Griseb. in Goett. Nachr.* (1868) 75; *Duthie Grass. N.W. Ind.* 41.—Festuca, *Wall. Cat.* n. 3798.

Temperate & Alpine Himalaya; from Kashmir, alt. 8–15,000 ft., *Jacquemont*, &c., to Garwhal, *Duthie*. Western Tibet; Ladak, *Thomson*, *Schlagintweit*.

Stems 15–20 in., stoloniferous, erect or ascending from a prostrate rooting base; internodes 5–7, gradually lengthening upwards, all but the upper included in the sheaths. *Leaves* 4–8 by $\frac{1}{6}$ in., linear, acute, smooth or nearly so, glabrous, flaccid, upper often longer than their sheaths; lower sheaths lax, upper about 6 in., smooth; ligule $\frac{1}{8}$–$\frac{1}{6}$ in., obtuse, or shorter in the surculi. *Panicle* up to 10 in., pyramidal, often elongate, very lax and flaccid, rachis smooth; lower branches often 6 in., capillary, flexuous, loosely branched and at the tips only, nearly smooth, branchlets roughish. *Spikelets* distant, oblong, pale green; rachilla glabrous or hairy; gls. thin, rather distant; I $\frac{1}{7}$–$\frac{1}{6}$ in., acute or acuminate, 3–1-nerved, margins hyaline, keel roughish; II rather larger, broader in the middle, lateral nerves sometimes short; flg. gls. $\frac{1}{6}$–$\frac{1}{5}$ in., oblong, subobtuse, keel and all the obscure nerves and interspaces or the outer only silky-hairy; palea $\frac{1}{4}$ shorter, keels ciliate especially towards the base. *Lodicules* unequally 2-lobed. *Anthers* $\frac{1}{50}$–$\frac{1}{16}$ in., elongate-oblong.

Var. *micranthera*, Stapf; fl. gls. less hairy, anthers smaller, gls. I and II usually thinner, lateral nerves sometimes obscure.—Kashmir, alt. 12–13,000 ft., *Clarke, Duthie.*

16. **P. Gammieana,** *Hook. f.*; stem leafy throughout, leaves broadly linear long-acuminate, ligule oblong, panicle contracted or at length open, lower branches binate or solitary, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. 3–2-fld., gls. firm, I lanceolate acute, II narrowly oblong, fl. gls. oblong tip only hyaline, nerves prominent outer and keel silky-hairy, keels of palea shortly ciliate, wool scanty.

SIKKIM HIMALAYA; Tankra Mts., alt. 12,000 ft., *Gammie.*

Stems 1–2 ft., terete, smooth, leafy; internodes 7–8. *Leaves* up to 4 by $\frac{1}{5}$ in., scattered along the whole stem up to the panicle, flat or plicate, glabrous, smooth, except the margins and midrib, upper shorter; lower sheaths lax, median 2½–3½ in., asperulous or nearly smooth, except the margins; ligule $\frac{1}{6}$–$\frac{1}{4}$ in., acute, dorsally roughly puberulous. *Panicle* up to 4½ in., narrow, lower branches capillary, flexuous, loosely branched at the tips only; branches and branchlets smooth. *Spikelets* $\frac{1}{4}$ in. and upwards, shortly or the terminal longer pedicelled, oblong, acute, pale green; gls. firm, I $\frac{1}{6}$ in., 3-nerved, margin entire hardly hyaline; II rather longer, narrowly oblong, 3-nerved; fl. gls. $\frac{1}{5}$ in., acute or subobtuse, keel and outer nerves prominent silky-hairy, palea rather shorter. *Lodicules* subquadrate, shortly 2-lobed. *Anthers* $\frac{1}{25}$ in., oblong.

17. **P. annua,** *Linn. Sp. Pl.* 68; stem shortly creeping and rooting stoloniferous, leaves flat flaccid acute, panicle ovate or oblong sometimes subsecund lower branches at length spreading or deflexed, spikelets 3–7-fld., gls. I and II oblong-lanceolate obtuse, flg. gls. prominently 5-nerved margins and tip broadly or narrowly scarious, keel and nerves below more or less silky ciliate, keels of palea long-ciliate, anthers minute. *Host Gram. Austr.* ii. t. 64; *Fl. Dan.* t. 1686; *Engl. Bot.* t. 1141; *Knapp Gram. Britt.* t. 52; *Reichb. Ic. Fl. Germ.* t. 82; *Ledeb. Fl. Ross.* iv. 377; *Boiss. Fl. Orient.* v. 601; *Griseb. in Goett. Nachr.* (1868) 75; *Wight Cat.* n. 1789; *Thw. Enum. Pl. Zeyl.* 372; *Trim. Cat. Ceyl. Pl.* 110; *Aitchis. Cat. Panjab Pl.* 168; *Duthie Grass. N.W. Ind.* 40, *Fodd. Grass. N. Ind.* 67. P. alpina, *Herb. Strach. & Winterb.* n. 12. P. Royleana, *Nees ex Steud. Syn. Gram.* 256. *Herb. Strach. & Winterb.* n. 3; *Duthie l. c.*; *Griseb. in Goett. Nachr.* (1868) 75.

Throughout the TEMPERATE & SUBALPINE HIMALAYA, & WESTERN TIBET, alt. 6–12,000 ft., the KHASIA and NILGHIRI HILLS, alt. 5–7000 ft. (introduced ?). CEYLON (introduced ?)—DISTRIB. Europe, Temp. Asia.

Annual or perennial; stolons slender. *Stems* 6–12 in., erect, usually geniculate, slightly compressed, smooth; internodes gradually lengthening upward, upper

exserted or not. *Leaves* 2–4 in., rarely more, by $\frac{1}{2}$–$\frac{1}{8}$ in., linear, smooth, margin roughish; sheaths up to 2 in., lax, subcompressed, usually longer than the blade, margins roughish; ligule ovate or oblong, up to $\frac{1}{8}$ in., shorter in the lower leaves. *Panicle* up to $3\frac{1}{4}$ in., rigid, lower branches up to $1\frac{1}{2}$ in., 2- rarely 3–5-nate or solitary, spreading, naked to the middle and branchlets smooth. *Spikelets* $\frac{1}{6}$–$\frac{1}{5}$ in., subsessile or shortly pedicelled, more or less crowded, ovate or oblong-ovate, green or purplish; gl. I $\frac{1}{12}$–$\frac{1}{10}$ in., lanceolate, acute, 1-nerved, with sometimes 2-slender lateral nerves, keel minutely scaberulous; II rather longer, 3-nerved; flg. gls. $\frac{1}{8}$ in., obtuse, rarely subacute. *Anthers* $\frac{1}{30}$ in. *Grain* $\frac{1}{25}$–$\frac{1}{12}$ in., oblong.

Var. *nepalensis*, Griseb. in Goett. Nachr. (1868) 75, perennial, stem 20 in., leaves 12–20 in., ligule shorter, panicle up to 6 in., lower branches almost capillary, upper and branchlets subscaberulous, spikelets more distant longer pedicelled glaucous green, keel and outer nerves of fl. gl. silky-hairy to the middle, wool often copious.—P. annua, β. *Nees in Herb. Royle.* Poa nepalensis, *Wall. ex Duthie Grass. N.W. Ind.* 40.—Poa, *Wall. Cat.* n. 3791. Western Himalaya, from Dalhousie to Nepal.

Var. *sikkimensis*, Stapf; perennial, rootstock slender giving off stems surculi and stolons at the nodes, leaves up to $\frac{1}{5}$ in. broad, ligule $\frac{1}{8}$–$\frac{1}{4}$ in. denticulate, panicle 3–6 in., branches slender flexuous and branchlets subscaberulous, glumes firmer, flg. gls. nearly glabrous, wool 0. P. alpina & nepalensis (*in part*), *Herb. Ind. Or. Hf. & T.*—Eastern Himalaya, alt. 11–15,000 ft., J. D. H., &c., W. Bhotan, *Cummins.* Some specimens approach *P. himalayana* in their slender habit and narrower leaves, but the ligule is much larger.

UNKNOWN SPECIES.

P. HANSIANA, *Royle Ill. Bot. Himal.* 416 (*name*).—Hansi & Saharunpore, *Royle.* Probably, from the localities, *P. annua.*

119. COLPODIUM, *Trin.*

See 103. **Catabrosa,** *Beauv.* p. 310.

120. **GLYCERIA,** *Br.*

Perennial, rarely annual grasses. *Leaves* linear, flat or convolute. *Spikelets* few or many-fld., in contracted or effuse panicles; rachilla jointed between the flg. gls. rarely hairy, uppermost fl. usually imperfect. *Glumes* I and II hyaline, empty, persistent, 1–5-nerved; flg. gls. broadly oblong obovate or fan-shaped, dorsally rounded, 3–9-nerved, nerves often obscure vanishing below the broadly hyaline obtuse rounded (rarely subacute) or truncate tip; keels of palea smooth or scaberulous. *Lodicules* 2, minute or well developed. *Stamens* 3. *Styles* short, distinct. *Grain* terete or compressed, free or subadherent to the palea—Species about 30 enumerated.

Sect. I. HYDROCHLOA. *Flg. glumes* strongly 7-nerved. *Lodicules* minute.

1. **G. tonglensis,** *Clarke in Journ. Linn. Soc.* xv. (1876) 119; very slender, leaves narrow smooth, panicle elongate slender, branches few erect at length spreading unequal lower up to 4 in. erect at length deflexed, spikelets $\frac{1}{6}$–$\frac{1}{4}$ in. 4–8-fld., gls. I and II 1-nerved. G. caspica, *Griseb. in Goett. Nachr.* (1868) 76 (*non Trin.*) G. fluitans, *Duthie Grass. N.W. Ind.* 41 (*non Br.*). G. rivularis, *Jacquem. mss.*—Poa n. 24, *Herb. Ind. Or. Hf. & T.*

TEMPERATE HIMALAYA, from Kashmir, alt. 7–9000 ft., and Kumaon, alt. 4–5000 ft., to Sikkim, alt. 7–12,000 ft. Munipore, alt. 9000 ft., *Watt.*

Stems widely creeping in wet places, more tufted in drier, 4–18 in., ascending,

slender. *Leaves* 3–8 by $\frac{1}{10}$–$\frac{1}{6}$ in., flat, tips obtuse; sheaths smooth, closed to the mouth; ligule short, rounded or truncate, 2-auricled. *Panicle* very variable, 4–8 in. long; rachis slender; branches few-fld. *Spikelets* pale-green or purplish, rarely more than 4-fld.; rachilla flexuous, glabrous; glumes glabrous, I and II ovate or ovate-oblong, hyaline, obtuse or subacute, I = about $\frac{1}{2}$ II; flg. gls. chartaceous, ovate-oblong, tip rounded hyaline, nerves 7 very prominent; palea rigid, incurved, keels strong scaberulous. *Anthers* very small, linear-oblong. *Grain* long, slender.—Very near *G. fluitans*, Br., of which it may be a variety, but differs from it in the much smaller and fewer-fld. spikelets. Some luxuriant specimens from marshy woods in Sikkim have larger 6–10-fld. spikelets nearly $\frac{1}{3}$ in. long.

Sect. II. ATROPIS. *Fl. gls.* 5-nerved. *Lodicules* large, hyaline.

2. **G. distans,** *Wahlb. Fl. Upsal.* 36; leaves linear flat or convolute smooth, panicle erect pyramidal or contracted lower branches up to $2\frac{1}{2}$ in. at length deflexed, spikelets $\frac{1}{12}$–$\frac{1}{8}$ in. 4–6-fld., gls. I and II very unequal scarious obtuse, flg. gls. broadly ovate-oblong or cuneate tip rounded or retuse and mucronulate crenate. *Fl. Dan.* t. 2222; *Reichb. Ic. Fl. Germ.* t. 79; *Duthie Grass. N.W. Ind.* 41. Poa distans, *Linn. Mant.* 32; *Host Gram. Austr.* ii. t. 63; *Fl. Dan.* t. 251; *Engl. Bot.* t. 986; *Knapp Gram. Britt.* t. 47. Atropis distans, *Griseb. in Ledeb. Fl. Ross.* iv. 388, *in Goett. Nachr.* (1868) 76; *Boiss. Fl. Orient.* v. 615. Festuca distans, *Kunth Revis. Gram.* i. 129, *Enum. Pl.* i. 393, *Suppl.* ii. 303.

WESTERN TIBET, alt. 10–16,000 ft., abundant, *Thomson*, &c.—DISTRIB. Europe, N. Asia.

Stems densely tufted with copious fibrous roots, 4–24 in. high, erect or ascending, stout or slender, leafy upwards or at the base only. *Leaves* very various, flat and $\frac{1}{3}$ in. broad in large specimens, quite smooth; sheaths open for $\frac{3}{4}$ of their length, lower membranous shining; ligule short, scarious. *Panicle* 3–6 in., rachis and branches smooth, lower branches 2–5-nate. *Spikelets* minute, green, more or less shining, minutely scaberulous; gl. I oblong, 1-nerved; II almost twice as large, usually 1-nerved; flg. gls. very variable, base minutely hairy, margins and tip broadly hyaline, nerves reaching $\frac{1}{2}$–$\frac{2}{3}$ from the base; keels of palea ciliate. *Lodicules* oblong, toothed. *Anthers* $\frac{1}{30}$–$\frac{1}{40}$ in.

Var. *convoluta*, Boiss. l. c.; stem taller very slender, leaves all convolute, panicle long narrow, branches shorter erect. G. convoluta, *Fries Mant.* iii. 176. Festuca convoluta, *Kunth Revis. Gram.* i. 129; *Enum. Pl.* 393. Atropis tenuiflora, *Griseb. in Ledeb. Fl. Ross.* iv. 389, *in Goett. Nachr. l.c.* 76.—Tibet common, N. Europe and Asia.—A different-looking plant from *G. distans* in its Tibetan form, being much more slender, with narrower more ovate flg. gls.; but very variable, and with intermediates.

3. **G. Thomsoni,** *Stapf*; leaves rigid asperulous above smooth beneath, lowest branches of panicle 2–3 in. spikelets up to $\frac{1}{3}$ in. oblong 3–5-fld., gl. I $\frac{1}{10}$ in. oblong-lanceolate subacute, II $\frac{1}{8}$ in. elliptic-oblong obtuse, flg. gl. $\frac{1}{6}$ in. tip subacute and margins hyaline yellow. Poa compressa, *Griseb. in Goett. Nachr.* (1868) 75.

WESTERN TIBET, Rupchu above Pugha, alt. 15,500 ft., *Thomson.*

Tufted, innovations erect. *Stem* rather stout, compressed, glabrous, sheathed throughout. *Leaves* up to 6 in., tapering to an acute or subobtuse point, upper short, pale green, thick, rigid, nerves 7–9 strong; sheaths more or less compressed, not keeled, smooth, striate, loose above; ligule broadly ovate, obtuse, scarious. *Panicle* ovate-oblong or contracted, erect or inclined; rachis scaberulous or smooth below; branches geminate, filiform, sparingly divided at length spreading, naked to about the middle; lateral pedicels short. *Spikelets* pale green or variegated; rachilla glabrous; gl. I 1-nerved, margin broadly hyaline; II 3-nerved, tip and margins

hyaline; flg. gls. smooth, glabrous, 5-nerved, outer nerves short. *Lodicules* obliquely ovate, acute. *Anthers* $\frac{1}{10}$ in. *Ovary* obliquely ovoid; styles very short, subterminal. —The long subacute flg. gls. are characteristic.

4. **G. poaeoides,** *Stapf*; leaves complicate scabrid above, longest branches of panicle 1–1½ in., spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. 2–4-fld., gl. II about $\frac{1}{10}$ in., flg. gls. $\frac{1}{8}$ in. obtuse tip broadly hyaline.

WESTERN TIBET; Rupchu, grassy plains at the head of the Salt Lake, *Thomson.*

Stems 1–1¼ ft., tufted, erect; innovation extravaginal erect, their sheaths open to near the base. *Leaves* 2–4 in., linear subacute, rather thick, smooth beneath, ligule triangular ovate acute. *Panicle* 2–4 in., erect or inclined, rachis scabrid; branches 2–4-nate, filiform, erect, sparingly divided, scaberulous, lowest very unequal, lateral pedicels clavate. *Spikelets* oblong rather loose, pale green or purplish, rachilla glabrous, disarticulating; gls. thin, finely ciliate-serrulate; callus glabrous; I ovoid acute, 3-nerved, side nerves faint short; II similar with stronger side-nerves; flg. gls. broadly elliptic-oblong, quite glabrous, dorsally rounded, nerves obscure except with transmitted light; keels of palea scantily shortly ciliate. *Lodicules* obliquely ovoid. *Anthers* $\frac{1}{15}$ in. *Ovary* pyriform, glabrous.

121. **FESTUCA,** *Linn.* (by O. Stapf.)

Perennial, rarely annual grasses. *Leaves* flat convolute or setaceous. *Spikelets* 3– many-fld., in open or contracted sometimes spiciform panicles, uppermost fl. imperfect; rachilla jointed below the flg. gls. not produced beyond the uppermost imperfect. *Glumes* 5 or more; I and II subequal or unequal, empty, persistent, keeled; I 1- very rarely 3-nerved, II 3- very rarely 5-nerved; flg. gls. narrow, acute acuminate or awned, 5–7-nerved, dorsally rounded, or keeled towards the tip only; palea 2-keeled. *Lodicules* 2. *Stamens* 3. *Ovary* glabrous or crown more or less hairy, not or slightly enlarged; styles terminal, rarely subterminal, stigmas plumose. *Grain* ventrally concave or grooved rarely flat, glabrous or crown hairy, free or more or less adherent with the palea, rarely with the gl., hilar area elongate. —Species many, chiefly of temp. climates.

The species are for the most part extremely difficult of discrimination.

Sect. I. EU-FESTUCA. Perennial. *Empty gls.* subequal. *Stamens* 3.

A. Vernation of all the leaves conduplicate permanently, or cauline more or less flat, always very narrow.

* Flg. gls. strongly involute, tightly embracing the grain firm, scabrid or if smooth not shining; ovary glabrous, innovations always intravaginal, their leaf-sheaths usually open to or near to the base, or middle in *F. Cumminsii.*

1. **F. valesiaca,** *Schleich. ex Gaud. Agrost. Helvet.* i. 242; slender, rigid, erect, leaves 2–6 in., panicle 1–2 in. narrow usually stiff, branches very short, spikelets $\frac{1}{6}$–$\frac{1}{5}$ in. 3–4-fld., awn much shorter than its gl., anthers linear $\frac{1}{30}$–$\frac{1}{14}$ in., grain adherent to palea and often to the gl. *Kunth Enum. Pl.* i. 401, *Suppl.* 334; *Reichb. Ic. Fl. Germ.* t. 63; *Steud Syn. Gram.* 306. F. duriuscula, & parviflora, *Hack. in Herb. Duthie,* & var. tenuis, *Hack. Monogr. Fest. Europ.* 288. F. ovina, L., *var.* Pseudovina, *Hack. l. c.* F. ovina, *Host Gram. Austr.* ii. 62, t. 86 (*non Linn.*). F. stricta, *Herb. Royle.* F. dubia & F. filiformis, *Jacquem. mss.*—F. n. sp. *Herb. Strach. & Winterb.* n. 2.

TEMPERATE and ALPINE HIMALAYA, alt. 10 16,000 ft., from Kashmir to Sikkim.—DISTRIB. Central and Eastn. Europe, Orient, Central Asia, Rocky Mts.

Stems 4–14 in. tufted, nodes 2, both in the lower $\frac{1}{4}$ of the stem. *Leaves* 2–6 in., setiform to capillary, 3–5-nerved, green or glaucous, rarely rough, bands of sclerenchyma distinct; sheaths of innovs. tight, smooth, open to near the base, persistent when dry; ligule very short, obscurely auricled. *Panicle* contracted; branches erect, solitary or 2-nate; lateral pedicels shorter than the spikelets. *Spikelets* oblong, broadly obovate when open, pale green or purplish; gl. I $\frac{1}{13}$ in., lanceolate, acute or subacute; II similar $\frac{1}{8}$ in.; flg. gls. $\frac{1}{8}$–$\frac{1}{6}$ in., smooth to scaberulous, pruinose, 5-nerved; palea oblong-lanceolate, sub-2-toothed, keels scabrid. *Lodicules* minute, obliquely ovoid. *Anthers* $\frac{1}{30}$–$\frac{1}{14}$ in., linear. *Ovary* glabrous. *Grain* $\frac{1}{14}$ in., ventrally grooved, hilum almost as long as itself.—As represented in India *F. valesiaca* is a very well defined species.

Var. *tibetica*, Stapf; stem 2–6 in., sheaths entire below the middle, panicle $\frac{1}{2}$–1 in. long up to $\frac{1}{3}$ in. broad, flg. gls. $\frac{1}{6}$ in., more or less purplish black and scabrid in the upper $\frac{1}{3}$, awn minute, anthers $\frac{1}{36}$–$\frac{1}{30}$ in. F. ovina, var. alpina, *Griseb. in Goett. Nachr.* (1868) 73. Tibet N. of Sikkim, alt. 17–19,000 ft. Differs from F. ovina, *var.* Halleri, to which it is referred by *Hack. l. c.* 112, in the sheaths being open to the middle and in the very minute anthers.

2. **F. Cumminsii,** *Stapf*; stem slender, leaves $\frac{3}{4}$–4 in., sheath open to below the middle, panicle 2–4 in. narrow nodding or flexuous, branches distant erect and flexuous, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. elliptic or (open) obovate awned, rachilla scabrid, flg. gls. oblong-lanceolate, palea 2-fid, anthers elliptic $\frac{1}{30}$–$\frac{1}{25}$ in., grain free. F. duriuscula, *Herb. Ind. Or. Hf. & T. (in part)*.

SIKKIM HIMALAYA, alt. 11–12,000 ft., *J. D. H.* W. BHOTAN, *Cummins.*

Stems 1–1½ ft., tufted, nodes 2–3 uppermost towards the middle, smooth except (usually) below the panicle. *Leaves* setaceous, or cauline rarely flat, very narrow ($\frac{1}{20}$ in.), subacute, smooth, nerves 5 green strong above, obscure beneath, marginal and carinal bands of sclerenchyma very slender; sheaths of innovs. open far beyond the middle, smooth, subpersistent, of the cauline leaves tight; ligule short, auricles usually long and acute. *Panicle* with scabrid rachis; branches usually solitary, dividing from near the base, scabrid; lateral pedicels shorter than the spikelets or very short. *Spikelets* pale green or purple, more or less scaberulous; I $\frac{1}{10}$–$\frac{1}{7}$ in., 1-nerved; II lanceolate, acute, $\frac{1}{7}$–$\frac{1}{4}$ in., 3-nerved; flg. gls. $\frac{1}{5}$–$\frac{1}{4}$ in., awn half as long to as long as the gl.; palea as long as the gl., conspicuously 2-fid, more or less scabrid. *Lodicules* 2-lobed. *Ovary* glabrous. *Grain* linear-oblong, $\frac{1}{7}$–$\frac{1}{6}$ in., ventrally grooved, hilum slightly exceeding the middle.

3. **F. polycolea,** *Stapf*; densely tufted, leaves setaceous, sheaths of innovs. crowded open to the base, panicle 2–3 in. open or contracted rigidly erect, rachis scabrid rarely nodding, branches subsolitary, spikelets $\frac{1}{2}$–$\frac{1}{3}$ in., glumes scabrid, flg. gls. oblong-lanceolate awned, palea 2-fid, anthers linear $\frac{1}{17}$–$\frac{1}{14}$ in., grain free. F. duriuscula, *Herb. Ind. Or. Hf. & T.* (*in part*).

NEPAL, *Wallich.* SIKKIM, alt. 12–16,000 ft., *J. D. H.*, &c.

Stems $\frac{3}{4}$–1¼ ft., nodes 2 in the lower half or third, smooth or scabrid below the panicle. *Leaves* rather rigid, of the innovations up to 6–8 in., subacute, smooth, not or obscurely sulcate, 5-nerved, bands of sclerenchyma continuous beneath or nearly so; sheaths persistent, pale, shining, of the stem tight smooth; ligule very short, obtusely auricled. *Panicle* ovate or narrower; lower branches scabrid, sometimes 2-nate, $\frac{1}{2}$– rarely 1½ in., very sparingly divided from near the base, upper with 1–2 spikelets; lateral pedicels shorter than the spikelets. *Spikelets* greenish; glumes firmly membranous; I $\frac{1}{10}$ in., subulate-lanceolate, 1-nerved; II $\frac{2}{9}$–$\frac{3}{10}$ in.,

lanceolate, acute; flg. gls. $\frac{1}{3}$–$\frac{2}{3}$ in., strongly involute, nerves 5 faint; awn from $\frac{1}{2}$ to as long as the gl.; palea as long as the gl., scabrid or puberulous. *Lodicules* 2-lobed. *Ovary* glabrous. *Grain* $\frac{1}{10}$ in., linear-oblong, deeply grooved, hilum slightly exceeding the middle.

Var. *brevis*, Stapf; stems 4–6 in. often shorter than the leaves, sheaths open to the middle only, panicle $\frac{1}{2}$–$1\frac{1}{2}$ in. contracted, flg. gls. $\frac{1}{7}$ in., anthers $\frac{1}{25}$–$\frac{1}{17}$ in.—Sikkim Himalaya, alt. 11–13,000 ft.—Referred by Hackel (Monogr. Festuc. Eur. 89) to *F. ovina*, var. *supina*, but evidently only a dwarfed state of *F. polycolea*.

** Flg. gls. glabrous or nearly so except sometimes towards the tip, thin, more or less shining; ovary very rarely glabrous.—Innovations intravaginal, their sheaths closed to beyond the middle, except in *nitidula*.

† *Flg. gls.* $\frac{1}{5}$–$\frac{1}{7}$ *in.*; *anthers minute*; *panicle usually very flexuous and flaccid.*

4. **F. nitidula,** *Stapf*; stems tufted, node solitary near the base, leaves 1–2 in. very narrow, panicle $1\frac{1}{2}$–3 in., ovate open or contracted, branches usually spreading flexuous naked to beyond the middle, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. 2–5-fld., margins of gls. narrowly hyaline, flg. gls. $\frac{1}{7}$ in. oblong-lanceolate, awn half as long as the gl., anthers elliptic $\frac{1}{50}$–$\frac{1}{40}$ in., ovary top sparsely hispidulous. F. pumila, *Duthie Grass. N.W. Ind.* 42 (*non Vill.*); *Herb. Strach. & Winterb.*—Festuca, n. 10, *Herb. Ind. Or. H.f. & T.*

Western Tibet; Nubra, alt. 12–14,000 ft., *Thomson*. N. of Kumaon, alt. 15,000 ft., *Strachey & Winterbottom*.

Stems $\frac{1}{2}$–$1\frac{1}{4}$ ft., far exserted beyond the uppermost sheath, smooth. *Leaves* complicate, rather thick, green, 5–7-nerved, smooth, bands of sclerenchyma hardly any; sheaths of innovs. closed to about $\frac{1}{3}$, smooth; ligule very short, ciliolate, more or less auricled. *Panicle* flexuous, sometimes flaccid; rachis smooth below; branches up to $\frac{1}{2}$ in., solitary or lowest 2-nate, subcapillary, sparingly divided; lateral pedicels often very short. *Spikelets* elliptic to lanceolate, green or purplish; gls. thinly membranous, I $\frac{1}{17}$–$\frac{1}{10}$ in., lanceolate; II $\frac{1}{8}$ in., lanceolate, distinctly 3-nerved; flg. gls. smooth, very minutely scaberulous below the tip; awn $\frac{1}{2}$ as long as the gl.; palea about as long as the gl., keels scaberulous. *Lodicules* 2-lobed. *Grain* $\frac{1}{10}$ in., free or adherent to the base of the palea, linear-oblong, hilum $\frac{1}{3}$ of the grain.—Thomson's specimens are tall and very slender, Strachey & Winterbottom's only 3–5 in. high.

5. **F. undata,** *Stapf*; stems tufted erect or base geniculate sheathed beyond the middle or almost to the panicle, nodes 2–3, uppermost about median, leaves subsetaceous subacute complicate or the cauline flat tapering to a fine point, panicle 4–6 in. flaccid flexuous, branches few subcapillary flexuous, spikelets $\frac{1}{4}$–$\frac{1}{3}$ in. 2–4-fld. lanceolate, gls. thinly membranous, flg. gls. oblong-lanceolate, awn 0 or very short, anthers not $\frac{1}{25}$ in., top of ovary hispidulous rarely glabrous.—Bromus, No. 16, *Herb. Ind. Or. H.f. & T.*

Sikkim Himalaya, alt. 12,000 ft., *J. D. H.*

Stems 1–2 ft. *Leaves* glabrous or puberulous above, 7–9-nerved, green; sheaths tight, basal thin brown rarely finely hairy; ligule very short, truncate, scarcely auricled, glabrous or sparsely ciliolate. *Panicle* often more or less secund; rachis smooth or scabrid, very slender; branches simple or very sparingly divided, solitary or the lowest binate up to 3 in. *Spikelets* pale green, somewhat shining; rachilla scantily scabrid, internodes very short; gl. I $\frac{1}{12}$ in., lanceolate, 1-nerved; II $\frac{1}{8}$ in., broadly lanceolate, acuminate, 3-nerved; palea oblong-lanceolate, about equal the gl., obscurely 2-toothed. *Lodicules* obliquely ovoid, sub-2-lobed. *Anthers* violet. *Styles* terminal.

Var. *aristata*, Stapf; awn as long as the gl. or rather longer very slender, anthers $\frac{1}{20}$–$\frac{1}{20}$ in., ovary (very young) glabrous.—Bromus?, No. 15, *Herb. Ind. Or. Hf. & T.*—Sikkim, alt. 11,000 ft.

†† *Flg. gls.* $\frac{1}{5}$–$\frac{3}{10}$ in.; *anthers linear*, $\frac{1}{12}$–$\frac{1}{6}$ in.; *panicle less wavy or flaccid.*

6. **F. kashmiriana**, *Stapf*: stems tufted, nodes 1–2 rarely 3 uppermost below the middle, leaves of the innovs. hexagonal, panicle 2–5 in., branches solitary lowest rarely geminate, spikelets $\frac{1}{3}$–$\frac{2}{5}$ in. elliptic-oblong 3–5-fld., gls. thinly membranous, flg. gls. oblong-lanceolate $\frac{1}{6}$–$\frac{1}{4}$ in., awn = $\frac{1}{2}$ gl. or longer, top of ovary densely hispid, grain loosely adherent to the palea. F. duriuscula, *Duthie Grass. N.W. Ind.* 41; *Herb. Royle & Hook. f. & T. in part.*

TEMPERATE and ALPINE HIMALAYA; from Kashmir to Kumaon, alt. 8–14,000 ft.

Stem 1–2 ft., innovations always apo-geotropic; sheaths of (always?) intravaginal shoots, tight, smooth, closed to the middle or $\frac{3}{4}$, rarely higher. *Leaves* (cauline) setaceous, usually shorter than of the innovations, rarely flat, more or less puberulous above, smooth beneath, green, sulcate between the 5–7 nerves, bands of sclerenchyma distinct; ligule short, truncate, ciliolate, scarcely auricled. *Panicle* usually contracted, rather stiff or flexuous; rachis scaberulous or smooth below; branches erect or spreading, filiform, scaberulous, sparingly divided from below the middle; lateral pedicels = $\frac{1}{2}$ the spikelet or shorter. *Spikelets* green or tinged with purple or violet; gls. smooth or obscurely scaberulous; internodes of rachilla $\frac{1}{20}$ in., minutely scaberulous; gl. I $\frac{1}{12}$–$\frac{1}{10}$ in., lanceolate, 1-nerved; II $\frac{1}{7}$ in., lanceolate or ovate-lanceolate, acute, 3-nerved; flg. gls. faintly 5-nerved. *Lodicules* obliquely oblong, 2-lobed. *Anthers* $\frac{1}{12}$–$\frac{1}{8}$ in., linear. *Grain* $\frac{1}{8}$ in., linear-oblong, grooved, hilum nearly as long as the grain.—I have seen only one specimen amongst all the forms of *F. kashmiriana* with apparently (but by no means typical) extravaginal innovations. Variegated specimens of the type resemble var. *nigricans* (*F. nigricans*, Schleich.) of *F. violacea*, and *F. rubra* var. *fallax*, forma *alpestris* (*F. nigrescens*, Lam.) from which they differ in absence of extravaginal shoots, more open sheaths, and more hispid ovary with a slightly developed constriction below the top.

Var. *ligulata*, Stapf; more flaccid, leaves up to 1 ft., ligule up to $\frac{1}{12}$ in. with more or less acute auricles. F. violacea, *var.* virescens, and F. rubra genuina, Hack. mss.—Kashmir, alt. 11–13,000 ft., *Duthie.*

Var. *debilis*, Stapf; very flaccid, cauline leaves up to 8 by $\frac{1}{10}$ in. pubescent above, nerves very prominent beneath, panicle flaccid, spikelets green, awn long or short. F. heterophylla, *Lamk. ex Hack. mss.*; *Griseb. in Goett. Nachr.* (1868) 73. — Kashmir, alt. 8–12,000 ft., *Duthie.*—Approaches closely shade forms of *F. heterophylla*, differing only in the structure of the leaves.

Var. *simlensis*, Stapf; taller, more robust, cauline leaves up to 1 ft. by $\frac{1}{10}$ in. almost flat, ligule short, panicle 6–12 in., spikelets $\frac{1}{2}$–$\frac{3}{4}$ in., internodes of rachilla up to $\frac{1}{8}$ in., gl. I $\frac{1}{7}$–$\frac{1}{6}$ in., II $\frac{1}{5}$–$\frac{1}{4}$ in., flg. gls. up to $\frac{1}{4}$ in., awn = the gl. or rather shorter. F. duriuscula, *Herb. H. f. & T.* (*in part*). ? F. ovina, *Griseb. in Goett. Nachr.* (1868) 73.—Simla, alt. 7–8000 ft., *Thomson*, *Duthie.*—Habit rather of *F. duriuscula*, differing in the more closed sheaths and hairy tip of ovary. Distinguished from certain forms of *F. rubra*, L., by the hairy ovary and absence of stolons.

7. **F. altaica**, *Trin. ex Ledeb. Fl. Alt.* i. 109, *Fl. Ross.* iv. 354, *Ic.* t. 228; stems tufted, nodes 1–2, leaves up to 9 in. subsetaceous, sheaths crowded open to the middle latterly to the base, ligule very short, panicle 4–6 in. very loose, lower branches 2-nate long slender with 1–2 subterminal spikelets, lateral pedicels equal to or longer than the 3–6-fld. variegated spikelets which are $\frac{1}{3}$–$\frac{1}{2}$ in. long, glumes thin tips and margins hyaline,

flg. gls. $\frac{1}{4}$–$\frac{3}{10}$ in., awns shorter or gl. mucronate, ovary pyriform tip hispidulous. *Kunth Enum. Pl.* i. 411; *Steud. Syn. Gram.* 315. F. Duthiei, *Hack. mss.*

WESTERN TIBET; Dras, alt. 11–12,000 ft., *Duthie*; Karakoram, alt. 14,500 ft., *Clarke.*—DISTRIB. Central Asia, Siberia.

Stems 1½–2½ ft., smooth. *Leaves* subrigid, complicate, smooth, margin obscurely scabrid, nerves 7–9 slightly prominent, bands of sclerenchyma distinct, cauline sometimes flat, short; sheaths of innovs. open to the middle, soon splitting to the base; ligule very short. *Panicle* ovate, rachis slender smooth, branches up to 3 in. subcapillary flexuous. *Spikelets* oblong, internodes $\frac{1}{20}$ in., scaberulous; gl. I $\frac{1}{7}$-$\frac{1}{5}$ in. lanceolate, acute, 1-nerved, II $\frac{1}{6}$–$\frac{1}{5}$ in., distinctly 3-nerved; flg. gls. oblong-lanceolate, smooth or subscaberulous towards the acute tip, nerves 5 faint; palea = the gl., linear-oblong, keels minutely scaberulous. *Lodicules* obliquely ovate. *Anthers* $\frac{1}{7}$–$\frac{1}{6}$ in., linear. *Styles* terminal.—Very near the American *F. scabrella*, Torr. Trinius describes the rhizome as stoloniferous, but I find no trace of stolons.

*** Flg. gls. glabrous or pubescent; top of ovary glabrous, rarely minutely hairy. Innovations intra- and extravaginal, their leaf-sheaths closed almost to the mouth, the extravaginal often stoloniferous.

8. **F. Levingei,** *Stapf*; stems smooth, nodes 2, upper in $\frac{1}{3}$ of stem, cauline leaves up to 4 in. very narrow, sheaths of innovs. open to middle, glabrous or minutely puberulous above, ligule very short obscurely auricled, panicle 2–3 in. linear strict, branches usually binate erect, lower naked for $\frac{1}{2}$, spikelets $\frac{1}{5}$–$\frac{1}{4}$ in. 4–5-fld. compact, internodes of rachilla very short minutely scaberulous, flg. gls. $\frac{1}{5}$–$\frac{3}{10}$ in. oblong acute awnless or mucronate, anthers oblong, ovary glabrous or nearly so.

KASHMIR, *Levinge.*

Stems 1½ ft., extravaginal innovations present very slender, their leaves finely setiform, flaccid, green, 5-nerved, bands of sclerenchyma fine. *Panicle* striate, branches often appressed to the rachis, lowermost up to 1½ in.; lateral pedicels short, thick. *Spikelets* green; rachilla minutely scaberulous; gls. membranous, glabrous or minutely puberulous or scaberulous; I $\frac{1}{10}$ in., lanceolate, acute; II broadly oblong-lanceolate, acute or subobtuse; palea linear-oblong, almost = gls., keels ciliolate. *Lodicules* oblong, sub-2-lobed. *Anthers* $\frac{3}{10}$–$\frac{1}{3}$ in. *Grain* $\frac{1}{12}$ in., loosely adherent to the palea, linear-oblong, grooved, hilum almost = the grain.

9. **F. rubra,** *Linn. Sp. Pl.* 74; stems smooth, nodes 2, extravaginal innovations frequent ascending or stoloniferous, leaves subsetaceous, ligule very short truncate exauricled, panicle 3–5 in., rachis scabrid, branches solitary or lowest binate divided from or near the base, spikelets $\frac{2}{5}$–$\frac{2}{3}$ in. oblong loose 4–9-fld., flg. gls. strongly involute oblong-lanceolate margin above broadly hyaline awned, anthers linear, ovary glabrous. *Host Gram. Austr.* ii. 59, t. 82; *Engl. Bot.* t. 2056; *Kunth Enum. Pl.* i. 401, *Suppl.* 334; *Steud. Syn. Gram.* 308; *Ledeb. Fl. Ross.* iv. 352; *Boiss. Fl. Orient.* v. 62; *Duthie Grass. N.W. Ind.* 42 (*in part*); ? *Griseb. in Goett. Nachr.* (1868) 74.

TEMP. and SUBALPINE HIMALAYA, alt. 6–13,500 ft. KHASIA HILLS, alt. 5–6000 ft. (var. *Clarkei*).—DISTRIB. Temp. and Arctic Europe and Asia.

Stems 1½–2½ ft., erect or geniculate below, striate. *Leaves* 3–5 in., all subsetaceous or cauline linear flat, rather thick, green, 3–7-nerved, subacute or almost obtuse, smooth; sheaths of innovs. tight, smooth, closed almost to the mouth. *Panicle* very variable, narrow, nodding and secund or erect, rather dense and ovate, longest branches 2 in.; pedicels short. *Spikelets* green or variegated, glabrous or hairy and ciliate; rachilla scabrid, internodes $\frac{1}{25}$ in.; gl. I $\frac{1}{7}$ in., lanceolate, acuminate, nerve

percurrent or subexcurrent; II $\frac{2}{9}$ in., ovate-lanceolate; flg. gls. up to $\frac{1}{7}$–$\frac{2}{9}$ in., nerves 5, faint; awn slender, up to $\frac{1}{10}$ in.; palea = the gls., linear-oblong, shortly 2-fid, keels ciliolate. *Lodicules* obliquely ovate, sub-2-lobed. *Anthers* $\frac{1}{12}$–$\frac{1}{8}$ in. *Ovary* with rarely 1–2 minute hairs. *Grain* $\frac{1}{7}$ in., linear-oblong, grooved, sometimes adherent to both gl. and palea, hilum nearly equal the grain.—It is impossible to separate the hairy glumed from the glabrous forms; these vary in specimens from different localities, and Clarke has found them growing in the same spot in the Karakoram Mts. To make a comparative analysis of the Indian forms with the European and Oriental would involve a most minute examination of all the latter and lead to the creation of a number of new varieties and subvarieties with ephemeral characters. Most of the Indian specimens fall into Hackel's subsp. *eur. rubra* var. *genuina*, and var. *fallax* (Monogr. Festuc. Europ. 138, 142). The glabrous stoloniferous specimens answer more or less to his subvar. *vulgaris*; those with short erect or ascending innovations to var. *fallax* and mostly to forma *alpestris*, which has thicker leaves and highly variegated spikelets; the pubescent to his subvar. *E. barbata*. The principal synonyms cited by Hackel for these forms are:—F. alpestris, *Wulf. Fl. Nor. Phan. Ed. Fenzl, & Graf*, 151. F. barbata, *Schrank Prim. Fl. Salisb.* 46. F. heterophylla, *Hænke in Jacq. Collect.* ii. 93. F. hirsuta, *Fl. Dan.* t. 1627 ? (*non Host*). F. Kitaibeliana, *Schult. Mant.* ii. 398 (for var. *genuina*). F. longifolia, *Hegetsch. & Heer Fl. Schw.* 91. F. nigrescens, *Lam. Encycl.* ii. 460. F. pubescens, *Willd. Enum. Pl.* 6. F. repens, *Hegetsch. & Heer l. c.* 92. F. rubra, *var.* baikalensis, *Griseb. in Goett. Nachr.* (1868) 74, is probably this. The true *F. baikalensis* is not found in India.

Var. *Clarkei*, Stapf; extravaginal innovations very rare slender, leaves subsetaceous cauline rarely flat, panicle 3–5 in. nodding, branches few subsecund lowest up to 3 in. rigid or flexuous mostly obliquely erect, spikelets $\frac{1}{2}$ in. pale green, gl. I $\frac{1}{5}$ in., II $\frac{1}{4}$ in., flg. gls. $\frac{1}{4}$–$\frac{3}{10}$ in., awn = $\frac{1}{2}$ to nearly all gl., anthers $\frac{1}{25}$–$\frac{1}{7}$ in., grain $\frac{1}{7}$ in.—Kangra and Dalhousie, alt. 7–8000 ft., *Clarke*. Khasia Hills, alt. 4–6000 ft., *Clarke* (a form with setaceous leaves and very long anthers).

B. Venation of leaves convolute, at length flat or subconvolute $\frac{1}{10}$–$\frac{7}{10}$ in. broad.

* Flowers hermaphrodite; innovations (when known) extravaginal.

† *Flg. gls. awned, awn as long as the gl. or longer, very slender.*

10. **F. gigantea,** *Vill. Hist. Pl. Dauph.* ii. 110; leaves amplexicaul, panicle 4–16 in., branches rather distant undivided to the middle, spikelets about $\frac{1}{2}$ in., flg. gls. $\frac{3}{10}$–$\frac{1}{3}$ in., awn twice as long, anthers linear. *Kunth Enum. Pl.* i. 407, *Suppl.* 339; *Reichb. Ic. Fl. Germ.* t. 358; *Engl. Bot.* t. 1820; *Ledeb. Fl. Ross.* iv. 354, *Boiss. Fl. Orient.* v. 621; *Duthie Grass. N.W. Ind.* 41; *Griseb. in Goett. Nachr.* (1868) 74 (*in part*). F. aristata, *C. Koch in Linnæa*, xxi. (1848) 412. F. triflora, *Sm. Engl. Bot.* t. 1918; *Desf. Fl. Atlant.* 6, t. 20. Bromus giganteus, *Linn. Sp. Pl.* 77; *Fl. Dan.* t. 1630; *Reichb. l. c.* t. 76; *Knapp Gram. Britt.* t. 87; *Host Gram. Austr.* 87, t. 6. B. triflorus, *Linn. Sp. Pl. Ed.* ii. 115; *Fl. Dan.* t. 440.

TEMP. HIMALAYA; from Kashmir to Kumaon, alt. 5–9500 ft.—DISTRIB. Europe, N. Asia.

Rootstock very short, roots fibrous. *Stems* loosely tufted, 2–4 ft., smooth, nodes 3–5. *Leaves* 5–12 by $\frac{1}{5}$–$\frac{1}{2}$ in., linear to linear-lanceolate, finely acuminate, flat, flaccid, dark green, loosely many-nerved, smooth, margins minutely scaberulous; sheaths of innovs. terete, open to the base, smooth or asperulous below the mouth; ligule very short, truncate, glabrous. *Panicle* ovate or oblong-ovate, nodding, branches solitary or the lowermost binate, spreading, flexuous, scabrid; branchlets few-fld. spreading or appressed, pedicels short or the lower sometimes = the spikelet. *Spikelets* linear-lanceolate, pale green, rachilla scabrid; gls. membranous, I $\frac{1}{10}$–$\frac{1}{7}$ in.,

subulate-lanceolate, 1- or obscurely 3-nerved at the base, margin white-hyaline; II $\frac{1}{5}$ in., lanceolate; flg. gls. $\frac{3}{10}$–$\frac{1}{3}$ in., oblong-lanceolate, acute or tip obscurely 2-fid, margins narrowly hyaline, minutely puberulous below the tip, nerves faint; awn subterminal, straight or flexuous; palea oblong-lanceolate, 2-toothed, keels minutely scaberulous. *Lodicules* large, 2–3-fid. *Anthers* $\frac{1}{10}$–$\frac{1}{7}$ in. *Ovary* quite glabrous. *Grain* $\frac{1}{5}$ in., linear-oblong, tightly adherent to the palea and usually the gl., groove flat; hilum nearly = the grain.

11. **F. leptopogon,** *Stapf*; leaf-base obtuse or rounded, panicle 6–12 in., branches distant dividing from near the base, spikelets $\frac{1}{4}$ in. or rather more, flg. gls. $\frac{1}{4}$–$\frac{1}{3}$ in., tip 2-fid, awn in the sinus = the gl. or rather longer. F. gigantea, *Griseb. in Goett. Nachr.* (1868) 74 (*in part*). Bromus, No. 17 & 18, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA, alt. 8–11,000 ft., *J. D. H.* KHASIA HILLS, alt. 5–6000 ft., *Hook. f. & T., Clarke.*

Rootstock short, slender, roots fibrous. *Stems* 2–4 ft., loosely tufted, nodes 5–6. *Leaves*, sheaths and ligule as in *F. gigantea*, but blade smaller, 4–7 by $\frac{1}{7}$–$\frac{1}{3}$ in., and base not amplexicaul. *Panicle* open or contracted, erect or nodding, branches scabrid; branchlets few, distant, more or less appressed, lateral pedicels very short. *Spikelets* linear-lanceolate, pale green; rachilla scabrid, internodes short; gls. membranous, I $\frac{1}{13}$ in., subulate-lanceolate, margins white-hyaline; II $\frac{1}{8}$ in., lanceolate; flg. gls. scaberulous below the tip, margins narrowly hyaline, nerves faint; palea linear-lanceolate, finely pointed, keels minutely scaberulous. *Lodicules* 2-fid. *Anthers* $\frac{1}{25}$–$\frac{1}{20}$ in., elliptic. *Ovary* with the top minutely hispidulous. *Grain* $\frac{1}{7}$ in., linear-oblong, free or adherent to the base of the palea, groove very shallow, top hispid, hilum = $\frac{2}{5}$ of the grain.

†† *Flg. gls. awnless, mucronate.*

12. **F. asthenica,** *Hook. f.*; stems rather slender, nodes 3, leaves linear narrowed at the base, panicle 5–8 in., branches capillary rough sparingly divided beyond the middle, pedicels capillary, spikelets $\frac{3}{10}$–$\frac{1}{3}$ in. lanceolate 2–4-fld., internodes of rachilla short, flg. gls. ovate-lanceolate acute 3–5-nerved.

KASHMIR, alt. 7–9000 ft., *Clarke, Duthie.*

Stem tall, up to 4 ft., smooth, innovations unknown. *Leaves* 6–11 by $\frac{1}{7}$–$\frac{2}{5}$ in. linear, finely acuminate, flaccid, rough, pale green, many-nerved, flat, young convolute; sheaths smooth or the lower scabrid, striate; ligule $\frac{1}{10}$–$\frac{1}{5}$ in., scarious, very obtuse, ciliolate, at length lacerate. *Panicle* more or less contracted, nodding, flexuous; rachis smooth below; lowermost branches up to 3 in., binate. *Spikelets* obovate when open, green; rachilla minutely scaberulous, internodes $\frac{1}{30}$–$\frac{1}{25}$ in.; gls. thinly membranous; I $\frac{1}{8}$–$\frac{1}{7}$ in., subulate-lanceolate, 1-nerved, hyaline except along the percurrent nerve; II $\frac{1}{7}$–$\frac{1}{5}$ in., oblong-lanceolate, acute, 3-nerved; flg. gls. $\frac{1}{5}$ in., ovate-lanceolate, acute, 5-nerved (2 lateral nerves very faint), scaberulous, tip hyaline; palea linear-oblong, minutely 2-toothed, keels slightly scabrid. *Lodicules* obliquely ovate. *Anthers* $\frac{1}{10}$ in., linear. *Ovary* hispidulous on the top. *Grain* $\frac{1}{7}$ in., linear-oblong, dorsally flat and almost so ventrally, slightly adherent to the palea, hilum $\frac{1}{4}$–$\frac{1}{5}$ in. shorter than the grain.

13. **F. modesta,** *Steud. Syn. Gram.* 316; stem tall rather stout, nodes 2-3, leaves of innovations linear finely acuminate, cauline smaller, panicle 6–12 in. loose open, rachis scabrid, lower branches very long binate sparingly divided beyond the middle, lateral pedicels short, spikelets about $\frac{1}{2}$ in. loosely 3–4-fld., internodes of rachilla long, flg. gls. oblong acute 5–7-nerved. *Duthie Grass. N.W. Ind.* 42. F. elatior, *Herb. Strachey & Winterb.* n. 3. Schedonorus modestus, *Nees ex Steud. l. c.*

WESTERN TEMPERATE HIMALAYA, from Jamu to Kumaon, alt. 7–8700 ft., *Royle*, &c.

Stems 4–5 ft., loosely tufted; innovations ascending or stoloniform. *Leaves* of innovs. up to 2 ft. by $\frac{1}{2}$–$\frac{2}{3}$ in., flat, young convolute, rough or almost smooth, subrigid, many-nerved, cauline 4–6 by $\frac{1}{5}$–$\frac{3}{10}$ in.; sheaths open to the base, smooth or the lower rough, strongly striate, at length brown; ligule $\frac{1}{7}$ in., truncate, ciliolate, at length lacerate. *Panicle* ovate, lower branches up to 8 in. *Spikelets* green, open obovate; rachilla scabrid, internodes up to $\frac{1}{10}$ in.; gls. thinly membranous, I $\frac{1}{7}$ in., subulate-lanceolate, hyaline except along the percurrent nerve; II $\frac{1}{5}$ in., oblong-lanceolate, acute, 3-nerved; flg. gls. $\frac{3}{10}$–$\frac{1}{3}$ in., scaberulous, margins narrowly hyaline; palea linear-oblong, 2-dentate, keels scarcely scabrid. *Lodicules* broadly elliptic, very obtuse. *Anthers* $\frac{1}{10}$ in., linear. *Ovary* top hispid, styles terminal.

14. **F. lucida,** *Stapf*; stem tall, nodes 2, leaves linear glaucous, sheaths long loose white, panicle 6–7 in. broadly ovate, branchlets very scabrid, lateral pedicels long, spikelets $\frac{4}{5}$–$\frac{9}{10}$ in. glistening, flg. gls. oblong acute or subobtuse mucronate 5–7-nerved, tips and margins hyaline, white.

WEST HIMALAYA; GARWHAL, Jaunsar, in the Deodar forest, alt. 9000 ft., *Duthie*.

Stem 2–3 ft., rather stout, smooth; internodes 2, elongate. *Leaves* 6–12 by $\frac{1}{2}$–$\frac{3}{4}$ in., finely acuminate, flat except the involute scaberulous margins, firm, smooth, glaucous, many-nerved; basal sheaths of innovs. very long, cauline tighter pale glaucous; ligule $\frac{2}{5}$–$\frac{3}{5}$ in., white, split to the middle into fine fibres. *Panicle* very lax; branches simple to beyond the middle, rough, lowest 4 in.; lateral pedicels $\frac{1}{3}$–$\frac{1}{2}$ in. *Spikelets* pale green; rachilla scabrid, internodes $\frac{1}{10}$–$\frac{1}{5}$ in.; gl. I $\frac{1}{3}$ in., ovate, acute or subacute, shortly 1-nerved, hyaline except at the base; II similar, $\frac{2}{5}$–$\frac{1}{2}$ in., midrib percurrent, 2 side-nerves very short; flg. gls. $\frac{1}{2}$–$\frac{3}{5}$ in., membranous, pale green, scaberulous, side-nerves prominent; palea linear-oblong, obscurely 2-fid, keels scabrid. *Lodicules* obliquely ovoid. *Anthers* $\frac{1}{2}$ in., linear. *Ovary* with a slightly oblique hispidulous top, styles just below the top.

** Flowers dicœcious; innovations intravaginal.

15. **F. sibirica**, *Hack. ex Boiss. Fl. Orient.* v. 626; stem sheathed to the top, leaves linear firm, panicle 3–6 in. ovoid or linear, lower branches simple or divided beyond the middle with 1–4 ovate-oblong 4–6-fld. spikelets, flg. gls. $\frac{1}{5}$–$\frac{1}{3}$ in. ovate or ovate-oblong subobtuse scaberulous, margins subciliolate or denticulate, awnless or tip setiform. F. mutica, *Jacquem. mss.* Schedonorus transparens, *Munro mss.* Poa albida, *Turcz. ex Trin. in Mem. Acad. Petersb. Ser.* VI. i. (1831) 387; *Kunth Enum. Pl.* i. 387. P. pallida, *Jacquem. mss.* Leucopoa sibirica, *Griseb. in Ledeb. Fl. Ross.* iv. 383, *in Goett. Nachr.* (1868) 76.—Festuca, n. 3, *Herb. H.f. & T.*—Schedonorus, n. 2, *Herb. Strachey & Winterb.*

WESTERN TIBET, alt. 13–15,000 ft., from Ladak to N. of Kumaon.—DISTRIB. Caucasus, Altai Mts., Dahuria.

Stems 1–2 ft., tufted, erect, smooth. *Leaves* 6–10 in., rarely more, by $\frac{1}{10}$–$\frac{1}{7}$ in., linear, finely acuminate, smooth or scabrid, subconvolute, dull green, nerves many very prominent, lower cauline one 3 in.; sheaths of innovs. open to the base, terete, basal crowded, cauline smooth; ligule very short, membranous, truncate, ciliate. *Panicle* very narrow or expanded, stiff or flexuous; lower branches solitary or binate, erect or spreading, very variable in length; lateral pedicels very short. *Spikelets* pale green, $\frac{3}{10}$–$\frac{4}{10}$ in., very broad when open; rachilla minutely scabrid, internodes $\frac{1}{40}$ in.; gls. thin, I $\frac{1}{10}$–$\frac{1}{7}$ in., ovate to ovate-lanceolate, subacute, 1-nerved or 3-nerved at the very base, white and hyaline except along the green nerve; II about $\frac{1}{5}$ in., similar, but more oblong and usually distinctly 3-nerved; flg. gls.

5-nerved, tip and margins broadly hyaline; palea oblong acute or sub 2-dentate; keels scabrid. *Lodicules* obliquely ovate, sometimes 2-lobed. *Anthers* $\frac{1}{8}$–$\frac{1}{7}$ in., linear, reduced and empty in the fem. fl. *Ovary* pyriform, top slightly oblique, hispidulous; styles very short, subterminal; stigmas $\frac{1}{5}$ in., plumose, more or less filiform in the male fl. *Grain* $\frac{1}{7}$ in., linear-oblong, quite free, dorsally subconvex, ventrally flat, hilum reaching rather above the middle.

Sect. II. VULPIA. Annuals (the Indian species). *Spikelets* subsecund in spiciform or racemiform panicles; pedicels clavate, often very short. *Glumes* divergent, I minute or 0, II much shorter than the flg., long-awned. *Stamens* 1–3; anthers very short. *Ovary* glabrous. *Grain* linear, adherent to the palea.

16. **F. Myuros,** *Linn. Sp. Pl.* 74; panicle elongate branched below base usually embraced by the upper sheath, pedicels half the length of gl. II or longer, gl. I minute, flg. gls. 5–8 as long as their awns, stamens 1–3. *Host Gram. Austr.* ii. 66, t. 93; *Engl. Bot.* t. 1412; *Knapp Gram. Britt.* t. 70; *Kunth Enum. Pl.* i. 396, *Suppl.* 330; *Ledeb. Fl. Ross.* iv. 349. F. Pseudomyuros, *Soyer Willem. in Ann. Sc. Nat. Ser.* I. vii. (1826) 445. ? F. uniglumis, *Griseb. in Goett. Nachr.* (1868) 73 (*non Soland.*). Vulpia Myuros, *Gmel. Fl. Bad.* i. 215; *Reichb. Ic. Fl. Germ.* i. t. 60; *C. Koch in Linnæa*, xxi. (1848) 409; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 71; *Boiss. Fl. Orient.* v. 628. V. Pseudo-myuros, *Reichb. Fl. Germ. Excurs.* 37. Mygalurus caudatus, *Link Enum. Hort. Berol.* i. 92.

WESTERN HIMALAYA, from Kashmir to Garwhal, alt. 5–9000 ft. WESTERN TIBET, alt. 9–12,000 ft.—DISTRIB. Europe, N. Asia.

Stem 6–18 in., very slender, leafy, glabrous. *Leaves* setaceous, upper with rather tumid grooved sheaths embracing the base of the panicle; ligule short, biauricled. *Panicle* 4–10 in., strict or flexuous, glabrous or puberulous, rachis and branches smooth or scaberulous, lower branches appressed, upper very short. *Spikelets* with the awns $\frac{1}{2}$–$\frac{3}{4}$ in.; rachilla smooth or ciliolate; gls. I and II subulate; flg. smooth or more or less scaberulous, nerves obscure.—I have seen no specimen of *F. uniglumis*, Soland. from India, and suspect Grisebach's plant to be *E. Myuros*.

Sect. III. NARDURUS, Reichb. (Gen.). *Spikelets* spicate, solitary, sessile on the joints of the rachis or with very short flat pedicels. *Glumes* divergent, equal or unequal; flg. gls. awned or not. *Stamens* 3, anthers minute. *Ovary* glabrous. *Grain* oblong or subpyriform, obtuse, ventrally concave, glabrous, adherent to the palea.

17. **F. tenuiflora,** *Schrad. Fl. Germ.* i. 345; leaves very short filiform subflexuous convolute, spike simple, spikelets secund sessile 3–7-fld., gls. I = $\frac{1}{2}$ II linear-subulate acuminate keeled, flg. gls. linear-lanceolate mucronate or shortly awned smooth or hispidulous. *Kunth Enum. Pl.* i. 395, *Suppl.* 330. F. maritima, *Linn. Sp. Pl.* 75. Nardurus tenuiflorus, *Boiss. Voy. Bot. Espan.* ii. 667, *Fl. Orient.* v. 632. N. unilateralis, *Fries ex Linnæa*, xxix. (1857-8) 730; *Fourn. in Bull. Soc. Bot. Fr.* xiii. (1866) 181. Catapodium unilaterale, *Griseb. in Ledeb. Fl. Ross.* iv. 347. Triticum hispanicum, *Willd. Sp. Pl.* i. 479. T. maritimum, *Willd. l.c.* (*in Syn.*). T. Nardus, *DC. Fl. Franc.* iii. 87. T. tenellum, *Viv. Ann. Bot.* i. II. 154; *Host Gram. Austr.* ii. 20, t. 86 (*excl. Syn.*). T. unilaterale, *Linn. Mant.* i. 35. Brachypodium tenuiflorum & tenellum, *Roem. & Sch. Syst.* ii. 745 (*ex Kunth*).

KASHMIR; near Sirinagur, alt. 5–6000 ft., *Duthie*.—DISTRIB. Westwd. to Spain. *Stems* 3–16 in., tufted, slender, wiry erect, strict or curved, smooth. *Leaves*

1–3 in., erect, sometimes almost capillary, grooved between the prominent ribs, ligule 0. *Spike* 2–4 in., short or curved, rachis smooth, wiry, grooved, ½- terete, with a shallow groove opposite the spikelets. *Spikelets* ⅛–⅙ in., green; fl. gls. rigid, terete, nerves indistinct. *Lodicules* subcuneate, acutely 2-lobed.

DOUBTFUL SPECIES.

F. filiformis, *Nees ex Duthie Grass. N.W. Ind.* 42 is probably a *Tripogon*.

122. **BROMUS**, *Linn.* (O. Stapf).

Annual or perennial grasses. *Leaves* narrow, usually flat. *Spikelets* many-fld., panicled, laterally compressed; uppermost fls. usually imperfect; rachilla jointed below the flg. gls., not produced beyond the uppermost gl. *Glumes* many, I and II unequal, empty, acuminate, 1–5-nerved, persistent, flg. gls. acuminate or shortly cleft; 1- very rarely 3-awned, median awn erect or recurved sometimes twisted towards the base; palea 2-fid or 2-toothed, keels scabrid or ciliate. *Lodicules* 2, oblong or lanceolate, entire or cleft. *Stamens* 3. *Ovary* oblong or cuneiform, crown more or less enlarged and hairy or villous. *Styles* usually inserted ventrally below the tip of the ovary, short; stigmas plumose. *Grain* linear-oblong, usually concavo-convex and adherent to the palea.—Species about 40, natives of temp. regions.

B. unioloides, H. B. K. (*B. Schraderi*, Kunth; Duthie Grass. N.W. Ind. 43; Fodd. Grass. N. Ind. 67), a tall American species with many-nerved keeled gls. has been introduced into India as a fodder grass, and has been found at Darjiling and elsewhere as an escape.

Sect. I. FESTUCOIDES, *Coss. & Dur.* Perennial, usually tall. Gl. I 1-nerved; II 3-nerved; flg. gls. 5–7-nerved; awn terminal or nearly so or 0.

1. **B. inermis**, *Leyss. Fl. Hall.* 16; rootstock creeping, panicle large, spikelets up to 2 in., awn of flg. gls. minute or 0. *Poll. Hist. Pl. Palat.* i. 111; *Schreb. Beschr. Graes.* i. 97, t. 13; *Host Gram. Austr.* i. 8, t. 9; *Kunth Enum. Pl.* i. 412, *Suppl.* 340; *Ledeb. Fl. Ross.* iv. 357; *Steud. Syn. Gram.* 321; *Boiss. Fl. Orient.* v. 642. B. littoreus, *Georgi Beschr. Russ. Reich. Nachtr.* 257; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 43. B. purpurascens, *Turcz. ex Ledeb. l. c.* ?B. variegatus, *Griseb. l. c.* (*non Bieb.*). Schedonorus inermis, *Beauv. Agrost.* 99. Festuca inermis, *DC. Fl. Fr.* iii. 49; *Reichb. Ic. Fl. Germ.* t. 70. F. Leysseri, *Moench Enum. Pl. Hass.* 41. F. poæoides, *Thuill. Fl. Paris, Ed.* II. 51. F. poaeformis, *Pers. Syn.* ii. 94. F. speciosa, *Schreb. Spicil. Fl. Lips.* 59. Tragus inermis, *Panz. in Denkschr. Akad. Muench.* (1813) 296.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 9–13,000 ft.—DISTRIB. N. Europe, Reg. Caucas., N. Asia.

Stem 2–4 ft., often stoloniferous, nodes usually pubescent. *Leaves* 6–9 by ¼–⅓ in., finely acuminate, glabrous or hairy above, smooth or scaberulous beneath, many-nerved; sheaths tight, striate; ligule very short, truncate, toothed. *Panicle* 6–8 in., open or contracted, erect or nodding, rachis smooth; lower branches 2–5 in., 3–4-nate, simple or sparingly divided. *Spikelets* pale green, rarely purplish, linear-oblong, loosely 5–12-fld., rachilla pubescent; gl. I ¼–⅓ in., lanceolate, keeled; II ⅓–⅖ in., oblong-lanceolate, subacute; flg. gls. ⅓–½ in., oblong-lanceolate, obtuse, 5- sub 7-nerved, glabrous or nearly so, tip and upper margins scarious; awn up to ⅙ in.; keels of palea rigidly ciliolate. *Anthers* ⅙–⅕ in. *Grain* $\frac{3}{10}$–⅓ in., oblong, more or less folded.—*B. inermis* in N.E. Asia passes into *B. ciliatus*, L., a characteristic form in N. America where *B. inermis* is absent.

Var. *villosus*, Mert. & Koch in Röhl. Deutsch. Flor. i. 675; spikelets pubescent to villous, lower sheaths and leaves more or less hairy.—Kashmir and Gilgit. Europe.

Var. *confinis*, Stapf; stem 1½–2½ ft., leaves hardly ⅕ in. broad hairy, panicle usually reduced to a raceme, spikelets densely pubescent. B. confinis, *Nees ex Steud. Syn. Gram.* 320; *Duthie l. c.* 42. B. pubescens, *Jacquem. mss.* B. Munroi, *Boiss. Fl. Or.* v. 643.—Kunawur and Gilgit.

2. **B. asper**, *Murray Prodr. Stirp. Gotting.* 42; rootstock short præmorse, panicle large, spikelets up to 1½ in., awn of flg. gls. ½ to nearly as long as the gl. straight. *Host Gram. Austr.* i. 6, t. 7; *Engl. Bot.* t. 1172; *Reichb. Ic. Fl. Germ.* t. 76; *Steud. Syn. Gram.* 320; *Ledeb. Fl. Ross.* iv. 356; *Boiss. Fl. Orient.* v. 643; *Griseb. in Goett. Nachr.* (1868) 64; *Duthie Grass. N.W. Ind.* 42. B. altissimus, *Weber in Wigg Prim. Fl. Holsat.* 9 (*non Pursh.*). B. dumetorum, *Lamk. Fl. Fr.* iii. 605. B. giganteus, *Vill. Hist. Pl. Dauph.* ii. 118 (*non Linn.*). B. hirsutissimus, *Cyrill. ex Roem. & Sch. Syst.* ii. 643. B. hirsutus, *Curt. Fl. Lond. fasc.* ii. t. 8 (*non Schrank.*). B. montanus, *Scop. Fl. Carn Ed.* II. i. 82. B. nemoralis, *Huds. Fl. Angl Ed.* II. i. 51. B. nemorosus, *Vill. l. c.* 218. B. Pseudo-asper, *Schur. Enum. Pl. Transs.* 804. B. ramosus, *Huds. Fl. Angl.* 40 (*non Linn.*). B. serotinus, *Benek. in Bot. Zeit.* iii. (1845) 724; *Steud. l. c.* Festuca aspera, *Mert. & Koch in Roehl. Deutsch. Flor.* i. 672. F. scaberrima & Wightiana, *Steud. l. c.* 316. Schedonorus asper, *Gaud. ex Roem. & Sch. l. c.* S. Benekeni, *Lange in Fl. Dan.* t. 2826. S. serotinus, *Rostoup in Kjoeb. Vidensk. Meddel.* (1864) 119. S. bromoides, *Wight & Ann. in Wight Cat.* n. 1795.—Bromus, n. 10 (*partim*), *Herb. Ind. Or. Hf. & T.*

Temperate Himalaya, alt. 6–11,000 ft., from Kashmir to Sikkim. Khasia Hills, alt. 5000 ft., *J. D. H.* and *T. T., Clarke.* Nilghiri and Pulney Hills, *Wight*; alt. 7000 ft., *Clarke.*—Distrib. Europe, N. Afr., W. and N. Asia.

Stems 2–6 ft., erect, smooth. *Leaves* 1–1½ ft. by ⅛–½ in., finely acuminate, flaccid, hairy above, beneath and margins scabrid, nerves many; sheaths villous or retrorsely hirsute, upper glabrous; ligule short, obtuse, ciliolate. *Panicle* up to 1 ft., loose, open or contracted, rachis rough or smooth below; branches 2-nate or lower 3–5-nate and unequal up to 7 in., spreading or deflexed, naked below. *Spikelets* linear to oblong, green, loosely 7–9-fld.; gls. rather firm; rachilla scabrid; gl. I ⅙–⅓ in., linear-lanceolate; II ¼– nearly ½ in., broader, more oblong; III ⅓– nearly ½ in., oblong-lanceolate, keeled below the tip, glabrous pubescent scabrid or side nerves, scabrid to ciliate, 5–7-nerved, tip and margin more or less hyaline; awn terminal or subterminal; palea obtuse, keels rigidly ciliate. *Anthers* ⅛–⅛ in., linear. *Grain* ⅓ in., linear-oblong, flat tightly-adherent to the gl. and palea.—The Sikkim, Khasia and some Nilghiri specimens have more acute and strongly nerved gls. than most of the N.-Western ones; but they are linked by many intermediates, and similar variations occur all over Europe.

3. **B. himalaicus**, *Stapf*; rootstock very short, panicle usually reduced to a raceme, spikelets up to 1 in., awn of flg. gl. as long as the gl. or longer recurved. B. asper, & Bromus n. 9 & 10 (*partim*), *Herb. Ind. Or. Hf. & T.*

Temperate Himalaya; E. Nepal, Sikkim and W. Bhotan, &c., alt. 8–12,000 ft., *J. D. H.*

Stems 2–2½ ft. *Leaves* 6–9 by ⅛–¼ in., finely acuminate, flaccid, hairy above, beneath and margins scabrid, many-nerved; sheaths tight, glabrous or lowest hairy when young; ligule short, truncate, usually dark-colrd. *Panicle* 5–7 in., open or contracted; rachis rough, or smooth below; branches 2-nate, or the lower 3–5-nate, spreading or deflexed, unequal, lowest up to 3 in., simple or sparingly divided. *Spikelets* linear-oblong, green, loosely 9-fld.; rachilla subscaberulous; gl. I ⅕–3/10 in., narrowly lanceolate, 1-nerved, keeled; II longer (3/10–⅓ in.) and broader;

III broader and thinner than in *B. asper*, glabrous pubescent or rigidly hairy towards the margins, 5–7-nerved, scarcely keeled below the tip, tip and margins hardly hyaline; callus large; palea obtuse, keels rigidly ciliate. *Anthers* linear-oblong, $\frac{1}{20}$–$\frac{1}{12}$ in. *Grain* $\frac{1}{5}$ in., linear-oblong, plano-convex, adherent to the gl. and palea.

Var. *grandis*, Stapf; branches of panicle almost all simple and bearing a solitary villous spikelet, gls. larger. B. confinis, *Herb. Strach. & Winterb.* —Kumaon and Sikkim, alt. 11–12,000 ft.

Sect. II. STENOBROMUS, *Griseb.* Annuals. *Gl.* I 1- rarely 3-nerved; II 3–5-nerved; flg. gls. 5–7-nerved; internodes of rachilla slender.

4. **B. crinitus**, *Boiss. & Hoh. in Boiss. Diagn. Ser.* I. xiii. 61, *Fl. Orient.* iii. 647; panicle rather stiff, spikelets $\frac{1}{4}$ in. elliptic-oblong, flg. gls. clavate not imbricating. *Steud. Syn. Gram.* 320; *Griseb. in Goett. Nachr.* (1868) 74. B. gracillimus, *Bunge in Mem. Sav. Etr. Petersb.* vii. (1851) 527; *Duthie Grass. N.W. Ind.* 42. Deschampsia aralensis, *Regel in Bull. Soc. Nat. Mosc.* xli. (1868) II. 300.

WESTERN TIBET; alt. 10–14,000 ft.; Baltistan, &c., *Thomson*, *Duthie*. Zanskar; *Schlagintweit*. BRITISH BELUCHISTAN, alt. 4–5000 ft., *Duthie*.—DISTRIB. Westwd. to Persia, Turkestan.

Stem 6–18 in., erect, slender, smooth. *Leaves* $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{1}{12}$–$\frac{1}{10}$ in., linear, flaccid, pilose or velvety; sheaths velvety; ligule ovate, lacerate. *Panicle* up to 4 in., oblong, erect or subnutant, rachis smooth; branches 3–5-nate, capillary, suberect or spreading, up to 2 in. *Spikelets* 3–6-fld., pale green; rachilla scabrid; gl. I $\frac{1}{7}$ in., lanceolate, acute, hyaline except along the middle; II $\frac{1}{6}$–$\frac{1}{5}$ in., broadly lanceolate, tip and margins hyaline; flg. gls. $\frac{1}{6}$ in., oblong, obtuse, strongly involute, ciliate on or near the margin, faintly 5-nerved; awn $\frac{2}{3}$ in., capillary, straight, terminal or nearly so; keels of palea ciliate. *Anthers* $\frac{1}{8}$–$\frac{1}{7}$ in. *Grain* $\frac{1}{8}$ in., linear-oblong, laterally compressed and folded; hilum as long as the grain.

5. **B. tectorum**, *Linn. Sp. Pl.* 77; panicle flaccid nodding often secund, spikelets $\frac{1}{2}$–1 in. cuneiform, flg. gls. long narrow. *Host Gram. Austr.* i. 13, t. 15; *Sibth. Fl. Græc.* i. t. 82; *Fl. Dan.* t. 1806; *Reichb. Ic. Fl. Germ.* t. 73; *Ledeb. Fl. Ross.* iv. t. 359; *Kunth Enum. Pl.* i. 419, *Suppl.* 344; *Boiss. Fl. Orient.* v. 647; *Steud. Syn. Gram.* 318; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 43. B. abortiflorus, *St. Amans. Fl. Agen.* 44; *Steud. l. c.* B. arenaceus, *Pourr. in Mem. Acad. Toul.* iii. (1788) 308. B. lateripronus, *St. Laz. in Ann. Soc. Bot. Lyon.* vii. (1880) 121. ?B. scabrifolius, *Opiz. Natural.* n. 9 (1825) 119. B. tectorium, *Dulac Fl. Haut. Pyren.* 96. Anisantha pontica, *C. Koch in Linnæa*, xxi. (1848) 394; *Steud. l. c.* 377.

WESTERN HIMALAYA, from Gilgit to Kumaon, alt. 7–11,000 ft.; Baltistan, *Duthie*.—DISTRIB. Europe, N. Africa, N. and W. Asia.

Stems 6–18 in., erect or ascending, glabrous or pubescent. *Leaves* up to 3 by $\frac{1}{8}$ in., linear, acute, flaccid, hairy; sheaths hairy, rarely glabrous; ligule ovate, lacerate. *Panicle* up to 5 in., flaccid; rachis smooth or nearly so; branches 3–6-nate, capillary, flexuous, often decurved with erect tips, sparingly divided. *Spikelets* green, loosely few- many-fld., rachilla scabrid; gl. 1 $\frac{1}{5}$–$\frac{1}{3}$ in., lanceolate, acute, 1- rarely 3-nerved, tip and margins hyaline; II $\frac{1}{3}$–$\frac{1}{2}$ in., oblong-lanceolate, 3–5-nerved; flg. gls. $\frac{1}{2}$– nearly $\frac{2}{3}$ in., thin, oblong-lanceolate, acutely 2-fid, 5–7-nerved, puberulous or scabrid above or all over, tip and margins hyaline; awn $\frac{1}{3}$–$\frac{3}{4}$ in., from the tip or below it, straight or slightly recurved; keel of palea long and loosely ciliate. *Anthers* $\frac{1}{2}$–$\frac{2}{5}$ in. *Grain* $\frac{1}{3}$–$\frac{2}{5}$ in., linear-oblong, dorsally compressed, ventrally concave or folded.—The form with a solitary flg. gl. (*B. abortiflorus*, St. Amans) may be expected to occur in N. India.

Sect. III. SERRAFALCUS. *Parl.* (Gen.) Annuals. *Gl.* I 3–5- rarely 1-nerved; II 5–9-nerved; flg. gls. 7–9-nerved; internodes of rachilla clavate above.

* *Flg. gls. all* 1-*awned. Panicle compact, rarely loose. branches short.*

6. **B. scoparius,** *Linn. Cent. Pl.* i. 6, *Sp. Pl.* 76; panicle very compact oblong to obovate, spikelets densely fascicled about $\frac{1}{3}$–$\frac{1}{2}$ in., flg. gls. oblong obtuse, awn = the gl. at length spreading. *Kunth Enum. Pl.* i. 420; *Bory Exped. Morée*, t. 5; *Steud. Syn. Gram.* 318; *Boiss. Fl. Orient.* v. 650. B. confertus, *Bieb. Fl. Taur. Cauc.* i. 71; *Steud. l. c.* 324; *Duthie Grass. N.W. Ind.* 42. B. chrysopogon, *Vis. Fl. Lyb. Spec.* 4, t. 2; *Steud. l. c.* 327. B. erectus, *Moris Stirp. Sard. Elench.* i. 50 (*non Huds.*). B. humilis, *Car. Ic.* vi. 65, t. 589. ?B. rubens, *Car. l. c.* t. 45 (*non Linn.*). Serrafalcus scoparius, *Parl. Fl. Ital.* i. 19. S. Cavanillesii, *Willk. & Lange Prodr. Fl. Hisp.* i. 101.

KASHMIR, alt. 5–6000 ft., *Falconer, Duthie.*—DISTRIB. Reg. Mediterr., Orient.

Annual. *Stems* $\frac{1}{4}$–$1\frac{1}{2}$ ft., erect, slender, glabrous. *Leaves* 2–$3\frac{1}{2}$ in. by $\frac{1}{8}$ in., linear, acute, hairs scattered stiff; sheaths tight, glabrous, mouth hairy; ligule short, truncate, toothed. *Panicle* 1–$1\frac{3}{4}$ in., erect, compact; rachis smooth; branches solitary or binate, short, crowded, scaberulous. *Spikelets* $\frac{1}{10}$–$\frac{1}{7}$ in. broad, pale green, densely 5–8-fld., rachilla scaberulous; glumes glabrous or hairy, nerves strong; gl. I $\frac{1}{7}$ in., ovate-lanceolate, acute or subacute, 3–5-nerved; II $\frac{1}{4}$ in., 5–7-nerved; flg. gls. $\frac{1}{4}$ in., minutely 2-fid, 7- sub 9-nerved; awn slender; keels of obtuse palea loosely long-ciliate. *Anthers* $\frac{1}{50}$–$\frac{1}{45}$ in. *Grain* $\frac{1}{50}$ in., linear-oblong, flatly concavo-convex or folded.

7. **B. mollis**, *Linn. Sp. Pl. Ed.* II. 112; panicle compact or loose but contracted ovate to oblong branches distinct, spikelets $\frac{1}{2}$–$\frac{3}{4}$ in. ovate-oblong or elliptic, awn about as long as the gl. straight. *Host Gram. Austr.* i. 16, t. 19; *Fl. Dan.* t. 1324; *Engl. Bot.* t. 1078; *Knapp Gram. Britt.* t. 77; *Reichb. Ic. Fl. Germ.* t. 74; *Schreb. Beschr. Gram.* t. 6. f. 1; *Kunth Enum. Pl.* i. t. 413, *Suppl.* 340; *Steud. Syn. Gram.* 323; *Ledeb. Fl. Ross.* iv. 361; *Steud. Syn. Gram.* 323; *Boiss. Fl. Orient.* v. 653; *Duthie Grass. N.W. Ind.* (*Royle's plant only*) B. arenarius, *Thomine Desm. in Mem. Soc. Linn. Calv.* (1824) 40 (*non Labill.*). B. atticus, *Steud. ex Nym. Consp.* 823; *Syn. Gram.* 321. B. compactus, *Hort. ex Steud. Nom. Ed.* II. ii. 227. B. Ferronii, *Mabelli in Act. Soc. Linn. Bord.* xxv. (1864) 613. B. glomeratus, *Tausch in Flora*, xx. (1837) 125 (*ex Boiss.*); *Steud. l. c.* 328. B. hordeaceus, *Linn. Sp. Pl.* 77. B. nanus, *Weig. Obs.* 8. B. patulus, *Duthie Grass. N.W. Ind.* 42 (*in part*). B. simplicissimus, *Cesati ex Nym. l. c.* Serrafalcus mollis, *Parl. Rar. Pl. Sic.* ii. 16. S. Thomini, *Hard. in Congr. Sc. Fr. Septr.* I. (1833) 59.

NORTH-WEST INDIA, *Herb. Royle* (Introd.?).—DISTRIB. Europe, N. Afr., As. Min.

Annual. *Stems* $\frac{1}{2}$–3 ft., erect or ascending, villous to glabrous. *Leaves* $1\frac{1}{2}$–4 in., linear, acute, flaccid, subhirsute above, pubescent beneath; sheaths velvety or softly hairy; ligule very short, denticulate, glabrous or hairy. *Panicle* 1–6 in., erect, rachis hairy; branches 3–6-nate, scabrid or softly pubescent. *Spikelets* $\frac{1}{3}$–$\frac{1}{4}$ in. broad, pale green, densely 5–12-fld., rachilla scaberulous; gls. broad, hairy to velvety, rarely glabrescent, nerves strong, tips and margins scarious; I $\frac{1}{4}$–$\frac{3}{10}$ in., ovate-lanceolate, acute or mucronate, 5-nerved, midrib percurrent; II $\frac{1}{3}$ in., elliptic-oblong, 7–9-nerved; flg. gls. $\frac{5}{10}$–$\frac{1}{2}$ in., broadly subobovate, obtuse, shortly 2-lobed, 7-nerved; awn subterminal as long or rather shorter than the gl.; palea obtusely

2-lobed, keels loosely long-ciliate. *Anthers* ½ in., oblong. *Grain* ⅓–¼ in., linear-oblong, flatly concavo-convex or folded, tightly adherent to the gl. and palea.

** *Flg. gls. all* 1-*awned, or some* 3-*awned in B. macrostachys. Panicle loose, open or contracted.*

8. **B. patulus**, *Mert. & Koch in Röhl. Deutsch. Flor.* i. 685; panicle linear-oblong usually nodding often secund branches long slender up to 6 in., spikelets ¾–1½ in. linear-oblong, awn about = the gl. usually recurved. *Kunth Enum. Pl.* i. 415; *Reichb. Ic. Fl. Germ.* t. 74; *Ledeb. Fl. Ross.* iv. 364; *Boiss. Fl. Orient.* v. 655; *Steud. Syn. Gram.* 325; *Griseb. in Goett. Nachr.* (1868) 74; *Duthie Grass. N.W. Ind.* 43. B. annuus, *Herb. Jacquem.* B. anatolicus, *Boiss. et Heldr. in Boiss. Diagn. Ser.* I. xiii. 63. B. arvensis, *Duthie l. c.* 42 (*non Linn.*); *Herb. Ind. Or. Hf. & T.* B. chapprianus, *De Not. ex Nym. Consp.* 824. B. commutatus, *M. Bieb. Fl. Taur. Cauc.* iii. 77 (*non Mert. & Koch.*). B. Cyri, *C. A. Mey. Verz Pfl. Cauc.* 24. B. japonicus, *Thunb. Fl. Jap.* 51, t. 11; *Franch. & Sav. Enum. Pl. Japon.* ii. 181 (*nom. prius*). B. Kochii, *C. Gmel. Fl. Bad.* iv. 76, t. 6. B. mollis, *Duthie l. c.* B. multiflorus, *Host Gram. Austr.* i. (*excl. exempl. Royle*) t. 11 (*nom Sm.*). B. pendulus, *Schk. in Verh. Siebend. Ver. Naturn.* iv. (1853) 90. B. phrygius, *Boiss. Diagn. Ser* II. iv. 140 B. polymorphus, *Hoh. Enum. Pl. Talusch.* 19. B. secalinus, *M. Bieb. l. c.* i. 71 (*non Linn.*). B. squarrosus, *Herb. Royle*; *Herb. Strach & Winterb.* (Bromus, n. 3); *Duthie l. c.* (*non Linn.*). B unilateralis, *Schur. l. c.* B. velutinus, *Nocc. et Balb. Fl. Tic.* i. 54 (*non Schrad.*). B. villiferus, *Steud. Syn. Gram.* 326 (*in part*). Serrafalcus patulus, *Parl. Fl. Ital.* i. 394.

WESTERN HIMALAYA, alt. 6–14,000 ft. Bhotan, *Griffith.*—DISTRIB. Europe, W. and N. Asia, China, Japan.

Annual. *Stems* 1–2 ft., erect or ascending, glabrous or puberulous. *Leaves* up to 8 by ¼ in., linear, acute or subacute, green, flaccid, hairy especially above; sheaths rarely all glabrous or hairy; ligule short, ovate, toothed. *Panicle* up to 8 in., narrow or open; rachis glabrous or pubescent; branches solitary or 3–7-nate, unequal, 1–4-spiculate, slender, flexuous, lower up to 6 in. long, simple or racemose, suberect spreading or nodding, scabrid at least above. *Spikelets* densely or loosely 7–14-fld., pale green; rachilla scabrid; gls. rather narrow, thin between the prominent nerves; I ⅓–¼ in., lanceolate, subacute, pubescent or scabrid, 3-nerved, tips and upper margins hyaline, II ⅜–½ in., oblong-lanceolate, 7-nerved; flg. gls. ⅓–½ in., elliptic-oblong or -lanceolate, subacute or obtuse, 2-toothed, margins infl-xed from the middle or above it; awn $\frac{1}{10}$–$\frac{1}{7}$ in., infra-apical, base rather stout, not or obscurely twisted; keels of palea loosely long-ciliate. *Anthers* $\frac{1}{12}$–$\frac{1}{21}$ in. *Grain* ⅓–⅜ in., linear-oblong, more or less concavo-convex, tightly adherent to the gl. and palea.—Griffiths' Bhotan specimen is a solitary one, probably introduced. The following are rather abnormal forms than varieties.

Var. *Falconeri*, Stapf; panicle very loose villous, gl. I narrowly lanceolate 1-nerved, II 5-nerved, flg. gls. 7-nerved.—B. tomentellus, *Duthie l. c.* 43 (*non Boiss.*).—N.W. India, *Falconer.*

Var. *microstachya*, Stapf.; spikelets small few-fl., gls. broader, I ½ in. 3–5-nerved, II ¼ in. 7–9-nerved, flg. gls. ¼–$\frac{3}{10}$ by ⅛ in. broad.—N.W. India, *Falconer.*

9. **B. oxyodon,** *Schrenk Enum. Pl. Nov.* ii. 1; panicle usually stiff suberect oblong contracted, branches up to 2 in., spikelets 1½ in. linear or linear-oblong, flg. gls. broadly hyaline. awn ¾–1 in. *Steud. Syn. Gram.* 326. B. macrostachys, *var.* oxyodon, *Griseb. in Ledeb. Fl. Ross.* iv. 363. B. multiflorus, *Kar. & Kiril. in Bull. Soc. Nat. Mosc.* (1841) 865.

KASHMIR. DRAS, BALTISTAN, ZANSKAR, &c., alt. 9–12,000 ft., *Thomson*, &c.—DISTRIB.—Turkestan.

Annual. *Stems* 6–18 in., erect or ascending, pubescent or subvelutinous. *Leaves* 2–5 in., linear, narrow, subacute, hairy or velvety; young sheaths villous; ligule ovate, lacerate. *Panicle* up to 5 in., usually contracted, erect, rachis pubescent; branches 2–5-nate, unequal, suberect, rarely nodding, scabrid, simple 1-3-spiculate. *Spikelets* pale green, densely 5–10-fld.; rachilla puberulous; gls. rather narrow, glistening, scabrid with appressed hairs, tips long-hyaline, nerves prominent; I $\frac{1}{3}$–$\frac{2}{5}$ in., lanceolate, 1–3-nerved; II $\frac{9}{20}$–$\frac{11}{20}$ in., oblong-lanceolate, 5-nerved; flg. gls. $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{8}$–$\frac{1}{7}$ in., oblong-lanceolate, margins inflexed below the middle, subacute, 2-toothed, 7–9-nerved; awn $\frac{3}{4}$–1 in., infra-apical, nearly straight or moderately recurved; keels of palea loosely long-ciliate. *Anthers* $\frac{3}{10}$–$\frac{2}{5}$ in. *Grain* $\frac{3}{10}$–$\frac{1}{3}$ in., linear-oblong, slightly concavo-convex.

10. **B. macrostachys,** *Desf. Fl. Atlant.* i. 96, t. 19, f. 2, *var.* triaristatus, *Hack. in Flora* (1879); panicle oblong or obovate-oblong loose or contracted, spikelets $1\frac{1}{2}$–$1\frac{3}{4}$ in. elliptic to linear-oblong, flg. gls. all or the upper only with 2 straight slender lateral awns, median awn $\frac{1}{2}$–$\frac{3}{4}$ in. finally twisted and strongly recurved. B. Danthoniæ, *Trin. in C. A. Mey. Verz. Pfl. Cauc.* 24; *Sp. Gram. Ic.* t. 353; *Duthie Grass. N.W. Ind.* 43. Boissiera Danthoniæ, *A. Br. Ind. Sem. Hort. Berol.* (1857) 3. Triniusa Danthoniæ, *Steud. Syn. Gram.* 328.

WESTERN TIBET; Spiti, alt. 12,000 ft., *Lance.*—DISTRIB. Affghan., Turkestan, As. Min. (of *B. macrostachys*, Mediterranean regions, Persia).

Annual. *Stem* 6–18 in., erect or ascending, glabrous or pubescent. *Leaves* 2–6 in., narrowly linear, acute or subacute, more or less hairy or velvety; young sheaths villous or velvety; ligule ovate, lacerate. *Panicle* up to 5 in., sometimes reduced to a spikelet, rachis glabrous or pubescent; branches solitary or the lower 3–4-nate, unequal, rarely 1 in., simple, 1–2-spiculate, strict, suberect, scabrid, rarely flexuous. *Spikelets* pale green, densely 6–20-fld.; rachilla pubescent; gls. broad, villous velvety or scabrid, tips and margins usually scarious and dull white, nerves prominent or not; gl. I $\frac{1}{5}$–$\frac{3}{10}$ in.; broadly lanceolate, 5-nerved; II about $\frac{1}{2}$ in., oblong, 7–9-nerved; flg. gls. $\frac{2}{5}$– nearly $\frac{1}{2}$ in., elliptic to obovate-oblong, subacute, 2-toothed, 9–11-nerved, margins inflexed from or from above the middle; lateral awns $\frac{1}{8}$–$\frac{1}{6}$ in, median $\frac{1}{2}$–$\frac{3}{4}$ in., infra-apical, often purplish, base stout; keels of palea long-ciliate. *Anthers* nearly $\frac{1}{2}$–$\frac{3}{5}$ in., rarely $\frac{9}{10}$ in. *Grain* $\frac{3}{10}$–$\frac{1}{3}$ in., linear-oblong, slightly concavo-convex, tightly adherent to the gl. and palea; hilum almost as long as the gl.

DOUBTFUL SPECIES.

B. MEMBRANACEUS, *Jacquem. mss.*; *Griseb. in Goett. Nachr.* (1868) 74 *Duthie Grass. N.W. Ind.* 43 is Duthiaea bromoides, *Hack.* (see p. 282).

123. DUTHIEA, *Hack.* See p. 282.

124. BRACHYPODIUM, *Beauv.*

Perennial slender grasses. *Leaves* flat or convolute. *Spikelets* terete, many-fld., subsessile or in a long slender spike appressed to the rachis; rachilla elongate and jointed below the fl. gls. *Glumes* many, imbricate in fl., spreading in frt.; I and II persistent; empty, narrow; flg. gls. oblong-lanceolate, acuminate, with a terminal straight awn or mucro, 7–9-nerved; keels of palea pectinately ciliate. *Lodicules* ciliate. *Stamens* 2–3, anthers linear. *Ovary* and *grain* as in Bromus.—Species 5 or 6, of north temp. and mt. regions.

1. **B. sylvaticum,** *Beauv. Agrost.* 101; roots fibrous, leaves more or less hairy or scaberulous flat, spike drooping, awn as long as its gl. *Thw. Enum. Pl. Zeyl.* 374; *Trim. Cat. Ceyl. Pl.* 110; *Ledeb. Fl. Ross.* iv. 346;

Boiss. Fl. Orient. v. 657. B. Fontanesianum, *Nees Fl. Afr. Austr.* 457. B. Fontanesii, *Ness in Herb. Ind. Or. Hohenack.* n. 914. B. gracile, *Beauv. l. c.*; *Reichb. Ic. Fl. Germ.* t. 16. B. nepalense, *Nees ex Steud. Syn. Gram.* 316. B. scaberrimum, *Wight & Arn. in Wight Cat.* n. 1796; *Steud. Nomencl. Ed.* II. i. 221. Bromus silvaticus, *Pollich Hist Pl. Palat.* i. 118; *Host Gram. Austr.* i. 17, t. 21; *Engl. Bot.* t. 729. B. dumosus, *Vill. Hist. Pl. Dauph.* ii. 119. B. gracilis, *Weig. Obs.* 15, t. 1, f. 11. B. pinnatus, *Fl. Dan.* t. 164 (*non Beauv.*). Festuca gracilis, *Moench Meth.* 191. F. sylvatica, *Huds. Fl. Angl. Ed.* I. 38; *Knapp Gram. Britt.* t. 76; *Steud. Syn. Gram.* 316. Triticum sylvaticum, *Moench Enum. Pl. Hass.* 54; *Kunth Enum. Pl.* i. 445. T. gracile, *Brot. Fl. Lusit.* 121. T. scaberrimum, *Steud. Nom l.c.* 717. Tragus gracilis, *Panz. in Denkschr. Akad. Muench.* (1813) 296.—Festuca, *Wall. Cat.* n. 3800.

Temperate Himalaya, alt. 6–12,000 ft., from Kashmir to Sikkim. The Khasia and Naga Hills, alt. 4–6000 ft., *Clarke*, &c. Nilghiri Hills, alt. 6000 ft., *Wight*, &c.—Ceylon, alt. 8000 ft., *Walker*, &c.—Distrib. Europe, N. Asia, S. Africa.

Stem 2–4 ft., very slender, simple or branched. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in. broad, usually flaccid, finely acuminate; sheaths more or less hairy; ligule short, obtuse. *Spikes* 2–6 in., or more, nodding; rachis compressed, glabrous, edges ciliolate. *Spikelets* 8–18 by $\frac{2}{3}$–1 in., green, glabrous sparsely hairy or scaberulous, nerves strong; gl. I and II strongly nerved; I subulate, $\frac{1}{3}$ shorter than II or less; II oblong-lanceolate, acute acuminate or shortly awned; flg. gls. about $\frac{1}{2}$ in. long, gradually narrowed into a slender erect awn, 7-nerved; awn $\frac{1}{5}$–$\frac{1}{3}$ in. *Anthers* $\frac{1}{3}$–$\frac{1}{2}$ as long as the palea.—The characters of the following varieties are far from constant.

Var. *longe-aristatum*, Hook. f.; flg. gl. $\frac{1}{2}$ in., awns $\frac{1}{2}$–$\frac{3}{4}$ in.—N.W. Himalaya; Kumaon and Dalhousie, alt. 6–9000 ft.

Var. *khasianum*, Hook. f.; callus of fl. gl. villous awn up to $1\frac{1}{4}$ in.—Khasia Hills.

Var. *Wattii*, Hook. f.; stem stouter, lower spikelets pedicelled, pedicel of lowest half as long as the spikelet or less pubescent, awn about as long as the gl. B. Wattii, *Clarke in Journ. Linn. Soc.* xxv. (1887) 90, t. 40.—Naga Hills, alt. 5500–7500 ft., *Clarke*.

Var. *Pseudo-distachyon*, Hook. f.; stem short 10–18 in. strict, leaves very narrow erect, spikelets few closer together, awn = half the gl. or shorter.—Kashmir and Kumaon.

2. **B. pinnatum**, *Beauv. Agrost.* 101, t. 19, f. 3; rootstock creeping, leaves convolute, spike erect, flg. gls. mucronate. *Ledeb. Fl. Ross.* iv. 345; *Boiss. Fl. Orient.* v. 658; *Reichb. Ic. Fl. Germ.* t. 16, 17; *T. Nees Gen. Fl. Germ. Monocot.* i. t. 70. B. Barrelieri, *Roem. & Sch. Syst.* ii. 741. B. cæspitosum, *Roem. & Sch. l. c.* 737; *Reichb. l. c.* t. 17; *Host Gram. Austr.* i. t. 22. B. constrictum, *Presl Cyp. & Gram. Sic.* 40. B. corniculatum, *DC. Fl. Franc.* v. 608. B. rupestre, *Roem. & Sch. l. c.* 736; *Host l. c.* iv. t. 17, 18. Bromus gracilis, *Leys. Fl. Hal.* 26. B. pinnatus, *Linn. Sp. Pl.* 78; *Host Gram. Austr.* i. t. 22; *Engl. Bot.* t. 730. Festuca pinnata, *Moench. Meth.* 191; *Huds. Fl. Angl. Ed.* II. i. 48; *Knapp. Gram. Britt.* t. 75. Triticum bromoides, *Weber ex Wigg. Prim. Fl. Holsat.* ii. T. gracile, *DC. Fl. Fr.* iii. 84. T. macrourum, *Turc. in Bull. Soc. Nat. Mosc.* (1838) 105. T. phœnicioides, *DC. l. c.* vi. 284. T. pinnatum, *Moench Enum. Pl. Hass.* 53; *Kunth Enum. Pl.* i. 445, *Suppl.* 364, t. 35. Tragus pinnatus, *Panz. in Denkschr. Acad. Muench.* (1813) 256. Avena laeta, *Salisb. Prodr.* 22.

Kashmir; alt. 6000 ft., *Clarke*.—Distrib. Eastwd. to Europe, N. Asia.

Glaucous. *Stem* 1–3 ft., very slender, naked above, smooth. *Leaves* rigid, almost glabrous, rarely flat; ligule ciliate. *Spike* 1–6 in.; rachis flattened, smooth.

Spikelets ¾–1½ in., erect, recurved from the rachis, glabrous or pubescent, green and purplish. *Glumes* coriaceous; I 5-nerved; II 7-nerved; flg. gls. oblong, mucronate, 5-nerved.

Tribe X. HORDEÆ. (See p. 8.)

125. **LOLIUM,** *Linn.*

Erect annual or perennial grasses. *Leaves* flat or convolute. *Spikelets* many-fld., solitary, sessile in the alternating distichous hollows of a terminal inarticulate spike, with the back of the lowest fl. gl. towards the rachis, rachilla jointed. *Glumes* many, I 0, except in the terminal spikelet; II erect, rigid, persistent, many-nerved, empty, margins not involute; flg. shorter than the empty, oblong, obtuse, acute or awned, dorsally rounded. 5– many-nerved; keels of palea ciliolate or serrulate. *Lodicules* 2, fleshy. *Stamens* 3. *Ovary* glabrous; styles terminal, feathery to the base, *Grain* glabrous, adherent to the palea.—Species few, of the temperate Old World.

The Italian Rye-grass. *L. multiflorum*, Lamk. (*italicum*, A. Br.) is a cultivated form of *L. perenne.*

1. **L. temulentum**, *Linn. Sp. Pl.* 83; annual, leaves flat, spikelets oblong-cuneate 3–8-fld., empty gl. linear many-nerved equalling or exceeding the rest of the spikelet, flg. gls. elliptic acute or awned. *Fl. Dan.* t. 160; *Host Gram. Austr.* t. 26; *Engl. Bot.* t. 1124; *Knapp Gram. Britt.* t. 101; *Reichb. Ic. Fl. Germ.* t. 5; *T. Nees Gen. Fl. Germ. Monocot.* i. t. 78; *Steud. Syn. Gram.* 340; *Kunth Enum. Pl.* i. 437; *Ledeb. Fl. Ross.* iv. 345; *Boiss. Fl. Orient.* v. 681; *Benth. Fl. Austral.* vii. 667; *Aitchis. Cat. Panjab. Pl.* 171; *Wall. Cat.* n. 3790; *Duthie Grass. N.W. Ind.* 44, *Fodd. Grass. N. Ind.* 68. L. annuum, *Lamk Fl. Fr.* iii. 620. L. arvense, *With. Arr. Brit. Pl. Ed.* III. ii. 168. Craepalia temulenta, *Schrank Baier Fl.* i. 382.

The UPPER GANGETIC PLAIN, the PANJAB, SIND, and WESTERN HIMALAYA, alt. 4–6000 ft.—DISTRIB. Europe, N. Asia (introd. elsewhere).

Stem 6–18 in., erect, usually stout. *Leaves* ⅛–⅓ in. broad, and sheaths smooth or scaberulous; ligule very short. *Spike* 6–10 in., strict, rachis stout. *Spikelets* very variable in size and shape, longer or shorter than the internodes; gl. I ⅓–⅔ in., rigid, erect; fl. gls. ⅛–⅙ in., awn ½ in. or shorter, or 0.

Var. *speciosum*, Griseb. in Ledeb. l. c.; spike very stout, gl. I large, flg. gls. short turgid obtuse. L. speciosum, *Stev. ex Bieb. Fl. Taur. Cauc.* i. 80. L. robustum, *Reichb. Ic. Fl. Germ.* xi. II. t. 4.—Western Himalaya (introd. ?).

2. **L. rigidum,** *Gaud., var.* Duthiei, *Hack. mss.*; annual, stem and spike very slender strict erect, leaves short narrow, spikelets narrowly oblong closely appressed to the rachis 3–6-fld., empty gl. rather shorter than the rest of the spikelet oblong-lanceolate subacute 5-ribbed, flg. gls. elliptic subacute 5-nerved scaberulous above the middle narrowed at the hyaline apex into a slender terminal awn or awn infra-apical.

KASHMIR; near Sirinagur, alt. 5–6000 ft., *Duthie* (no. 10,846).—DISTRIB. of *L. rigidum*, westward to the Caucasus and S. Europe.

I adopt Hackel's determination of this grass, which differs from *L. rigidum* proper in the narrower spikelets closely appressed to the rachis of the spike, and in the awned glumes, a character to which there is no approach in any of the numerous

specimens of *L. rigidum* which I have examined. The awns are as long as the gls. or longer.

3. **L. perenne,** *Linn. Sp. Pl.* 83; perennial, leaves linear complicate in vernation, spikelets oblong 3–11-fld., empty gl. 3–5-ribbed, shorter than the rest of the spikelet, fl. gls. oblong-lanceolate obtuse or sub-acute 5-nerved awned or not. *Fl. Dan.* t. 747; *Host Gram. Austr.* i. t. 25; *Engl. Bot.* t. 315; *Knapp Gram. Britt.* t. 180; *Reichb. Ic. Fl. Germ.* t. 8; *T. Nees Gen. Fl. Germ. Monoc.* i. n. 78; *Kunth Enum. Pl.* i. 436, *Suppl.* 358, t. 33, f. 1; *Ledeb. Fl. Ross.* iv. 343; *Boiss. Fl. Orient.* v. 679; *Duthie Grass. N.W. Ind.* 44, *Fodd. Grass. N. Ind.* 68. L. vulgare, *Host l. c.* t. 25.

Western Tibet, alt. 15,000 ft., *Stolizka* (*Duthie*); Sikkim Himalaya, alt. 7000 ft., *Clarke* (introduced).—Distrib. Europe, N. Asia.

Probably not indigenous in India, though likely to occur in temperate regions. Its perennial character and stoloniferous habit at once distinguish it.

126. LEPTURUS, *Br.*

Small slender grasses. *Leaves* flat or convolute. *Spikelets* 1–2-fld., sessile, solitary, ½ immersed in hollows of the rachis of a simple terminal articulate or not straight or incurved spike, with the back of the lowest fl. gl. opposite the rachis; rachilla jointed. *Glumes* 3 or 4, I minute or 0; II longer than the flg. gls., linear, rigid, acute, 5-nerved, erect or at length deflexed; III and IV much shorter than II, hyaline; palea 2-keeled. *Lodicules* 2, cuneate or lobed. *Stamens* 1–3. *Ovary* glabrous; styles short, distant. *Grain* narrow or oblong, glabrous, free.—Species 6, natives of the Old World.

1. **L. repens,** *Br. Prodr.* 207; perennial, creeping, spikes shortly peduncled fragile, gl. I 0, II acuminate or sub-aristate many-nerved much longer than the flg. gls. *Brongn. in Duperr. Voy. Bot.* 57, t. 16; *Kunth Enum. Pl.* i. 463, *Suppl.* 374; *Steud. Syn. Gram.* 357; *Trim. Cat. Ceyl. Pl.* 110; *Benth. Fl. Austral.* vii. 668. L. aciculatus, *Steud. l. c.*; *Miq. Fl. Ind. Bat.* iii. 403. Rottboellia repens, *Forst. Prodr.* 9. Monerma repens, *Beauv. Agrost.* 117. Lolium coelorachis, *Forst. in Herb. Paris, Steud. Nom. Ed.* II. ii. 64.

Ceylon; near Colombo, *Trimen.*—Distrib. Malay and Pacific Islds., Australia.

Stem elongate, woody branched and widely creeping below. *Leaves* 3–6 by ⅛–¼ in., spreading or erect, acuminate, glaucous; sheaths glabrous or mouth ciliate; ligule inconspicuous. *Spikes* 2–6 in., strict, erect; rachis glabrous. *Spikelets* 2-fld., rachilla elongate bearing an upper imperfect fl.; empty gls. 1 (or 2 in the uppermost spikelet) flat, rigid, ¼–½ in. long, closely appressed to the rachis; flg. gls. much shorter than the empty, elliptic, concave, 3-nerved; palea 2-keeled. *Lodicules* fleshy, obliquely truncate or 2-lobed, glabrous. *Grain* oblong.

2. **L. Roxburghianus,** *Steud. Syn. Gram.* 357; annual, erect, spikes long-peduncled very slender inarticulate, gl. I minute ovate, II linear-oblong acute rather shorter than the flg. gls. Rottboellia biflora, *Roxb. Fl. Ind.* i. 357 (*non Roth.*); *Kunth Enum. Pl.* i. 467. R.? Roxburghiana, *Schult. Mant.* ii. 430.

Deccan Peninsula, *Roxburgh.* Eastern Panjab, dry hills in Hissar, *Herb. Duthie.*

Whole plant 8 in. high, densely tufted. *Leaves* 3–4 in., filiform or setaceous,

flexuous, flattened, margins ciliate with long strict hairs; sheath very short; ligule minute, 2-auricled. *Spikes* 2–3 in., as long as the filiform pedicels and hardly stouter, strict, erect. *Spikelets* $\frac{1}{10}$–$\frac{1}{8}$ in. 2-fld., both fl. bisexual (always?); gl. I sunk in the hollow of the rachis, obliquely ovate, 1-nerved, hyaline; II linear-oblong, acute, coriaceous, dorsally smooth, convex with a broad undefined midrib; III hyaline, distinctly 3-nerved, oblong, truncate, callus penicillate; palea hyaline, keels smooth; IV narrower than III; rachilla slender, penicillate. *Lodicules* minute. *Anthers* very short; filaments long. *Ovary* short; styles short, bases remote, divergent.—There is in Roxburgh's unedited Icones an excellent drawing of a small state of this plant, of which I have no specimen but Mr. Duthie's; it is no doubt overlooked from its small size and habit.

127. **OROPETIUM,** *Trin.*

A very small densely tufted erect annual. *Leaves* filiform. *Spikelets* very minute, 1-fld., half immersed in the alternating distichous cavities of the rachis of a simple slender curved inarticulate spike; rachilla bearded. *Glumes* I and II empty, persistent, I very minute, hyaline; II linear-lanceolate, rigid, recurved in fruit, tip obtuse or emarginate; III shorter, broader, hyaline, obtuse or truncate, 1-nerved; palea narrow, keels smooth. *Lodicules* 0? *Stamens* 3. *Styles* short. *Grain* oblong, terete, free.

Nardus stricta, Linn., is, according to Stewart, "Panjab Plants," p. 257, a native of the Trans-Indus district, and at a considerable elevation in the Jhelum basin. This is no doubt an error. Boissier gives as its Eastern limit, the Caucasus.

O. Thomaeum, *Trin. Fund. Agrost.* 98, t. 3; *Kunth Enum. Pl.* i. 464, *Suppl.* 375; *Miq. Fl. Ind. Bat.* iii. 403; *Thw. Enum. Pl. Zeyl.* 363; *Trim. Cat. Ceyl. Pl.* 110; *Wall. Cat.* n. 8869; *Wight Cat.* n. 1727; *Duthie Grass. N.W. Ind.* 45, *Fodd. Grass. N. Ind.* 69. Rottboellia Thomæa, *Koenig in Naturf.* xxiii. (1788) 210; *Willd. Sp. Pl.* i. 464; *Roxb. Pl. Corom.* ii. 17, t. 133, *Fl. Ind.* i. 357; *Dalz. & Gibs. Bomb. Fl.* 300. R. pilosa, *Willd. l. c.* 465. Nardus Thomæa, *Linn. f. Suppl.* 105; *Sm. in Trans. Linn. Soc.* i. 116.

PLAINS OF INDIA; from the Panjab to Bengal, Burma, and southward in the WESTERN PENINSULA. CEYLON, *Gardner*.

Whole plant 2–3 in. high, forming hard tufts, stems compressed. *Leaves* $\frac{1}{2}$–1 in., erect, margins ciliate with long strict hairs; sheath short, open; ligule lacerate, not auricled. *Spikes* 1–1$\frac{1}{2}$ in., about $\frac{1}{30}$ in. diam., solitary or fascicled on very short branches, curved; rachis undulating, green, tetragonous, with a broad central nerve on the flat faces. *Spikelets* $\frac{1}{20}$ in., closely appressed to the rachis in the hollow of which the minute gl. I is sunk; gl. II slightly convex with a broad thickened centre; III semicircular in profile, excessively membranous, keel most minutely scabrid.

128. **TRITICUM,** *Linn.*

Annual or biennial grasses. *Leaves* flat. *Spikelets* few-fld., tumid, sessile, distichously spicate, solitary, with their sides opposite cavities in the articulate or inarticulate rachis; upper fl. male or neuter. *Glumes* rigid, often unequal-sided, I and II empty, obtuse or shortly awned, few-nerved, persistent; flg. gls. oblong or ventricose, dorsally rounded or keeled above, awnless or 1–3-awned, 5–9-nerved, lateral nerves not conniving with the central; keels of palea ciliate. *Lodicules* entire, ciliate. *Stamens* 3. *Styles* very short. *Grain* grooved ventrally, often hairy, free or adherent to the palea.—Species about 10, Oriental and Eastern Asiatic.

Sect. I. TRITICUM, proper. *Glumes* keeled.

T. VULGARE, *Vill. Hist. Pl. Dauph.* ii. 153; *Host Gram. Austr.* iii. 18, t. 26; *Wall. Cat.* n. 2334: *Kunth Enum. Pl.* i. 438, *Suppl.* 360, t. 34; *T. Nees Gen. Fl. Germ. Monoc.* i. t. 79; *Aitchis. Cat. Panjab Pl.* 171. T. sativum, *DC. Fl. Fr.* iii. 625; *Lam. Encycl.* ii. 554; *Duthie Grass. N.W. Ind.* 45, *Fodd. Grass. N. Ind.* 68.

Cultivated in many parts of NORTHERN INDIA and the DECCAN PENINSULA, especially in the N.W., and up to 13,000 ft. in the HIMALAYA and TIBET.

It is beyond the scope of this work to detail the races of wheat cultivated in India, for which I must refer to Murray's article in Watts' "Dictionary of the Economic Products of India," and to Koernecke & Werner's "Handb. der Getreide Arten," ii. 209. All are believed to have been derived from *T. monococcum*, Linn., a native of the East from Greece to Mesopotamia. Hackel, the latest botanical writer on the wheats (in Engler & Prant. Planzenfam. ii. 80), regards all as referable to three species, *monococcum*, *sativum*, & *polonicum*, Linn. (the last is not cult. in India). According to Murray and others the following races are cultivated in India as elsewhere:—T. æstivum, *Linn. Sp. Pl.* 86; *Roxb. Fl. Ind.* i. 359; *Grah. Cat. Bomb. Pl.* 234; *Dalz. & Gibs. Bomb. Fl. Suppl.* 97. T. amyleum, *Ser. Mel. Bot.* i. 124. T. compactum, *Host Gram. Austr.* iv. 4, t. 7. T. compositum, *Linn. Sp. Pl. Ed.* II. 126. T. dicoccum, *Schrank. Fl. Baier*, i. 389. T. durum, *Desf. Fl. Atlant.* i. 114; *Stewart Panjab. Pl.* 262. T. hybernum, *Linn. Sp. Pl.* 80, *Roxb. l. c.* T. Spelta, *Linn. l. c.*; *Host l. c.* iii. 31, t. 30. T. Zea, *Host l. c.* t. 29. T. turgidum, *Linn. l. c.*; *Host. l. c.* t. 28.

Dalz. & Gibs. have also, as cultivated in the Concan, a *T. pilosum*, Dalz. & Gibs. Bomb. Fl. Suppl. 97, the "Buckshee wheat" with tomentose spikelets. I have seen no specimens of it.

Sect. II. ÆGILOPS. *Glumes* dorsally rounded, not keeled.

T. Ægilops, *Beauv. Agrost.* 180; annual, leaves linear flat, spike elongate cylindric fragile, spikelets oblong turgid 3–5-fld. half sunk in hollows of the rachis, gl. I and II similar oblong-quadrate many-nerved, fl. gls. rather longer awnless or in the upper spikelets with one strict erect awn. Ægilops squarrosa, *Linn. Sp. Pl.* 1051; *Tausch. in Flora*, xxxix. (1837) 108; *Kunth Enum. Pl.* i. 458, *Suppl.* 371; *Jaub. & Spach. Ill. Pl. Or.* iv. 12, t. 310; *Schreb. Gram.* ii. t. 27, f. 2; *Cav. Ic.* t. 90; *Ledeb. Fl. Ross.* iv. 326; *Boiss. Fl. Orient.* v. 676. Æ. cylindrica, *C. A. Mey. Verz. Pl. Cauc.* 26 (*non Linn.*). Æ. Tauschii, *Coss. Notes Crit.* 69.

N.W. INDIA, *Falconer*; Wazuristan, alt. 4500 ft., *Stewart.*—DISTRIB. Westward to Spain and N. Africa.

Stem 6–18 in., erect or geniculately ascending, stiff, leafy. *Leaves* acuminate, smooth or slightly scabrid; sheaths smooth, upper subventricose; ligule very short. *Spike* 1½–5 in., strict; rachis stout. *Spikelets* ½–¼ in., alternating in close succession; gl. I and II coriaceous, tip truncate often crenulate; flg. gls. hardly longer, truncate or retuse; awns ½–1½ in.

DOUBTFUL SPECIES.

T. BENGHALENSE, *Host ex Steud. Nom. Ed.* II. ii. 715.

ÆGILOPS CILIARIS, *Koen. ex Roem. et Sch. Syst.* ii. 772 (genus *Manisuro proximus*) = Rottboellia ciliaris, *Willd. ex Steud. l. c.* 474 (*Ischæmi* sp., Trin.).

ÆG. CORDATA, *Linn., Aitch. Cat. Panjab. Pl.* 560.

129. AGROPYRON, *J. Gærtn.*

Annual or perennial grasses. *Leaves* flat or convolute. *Spikelets* 3–many-fld., solitary, sessile, distichously arranged opposite to hollows in the rachis of a simple spike, with the sides of the glumes opposite the rachis;

rachilla usually jointed between the fl. gls. *Gl.* I and II empty, opposite, (not collateral) narrow, unequal, persistent; fl. gls. rigid, awned or not; nerves 5–7, converging above; keels of palea ciliate. *Lodicules* entire or ciliate. *Stamens* 3. *Ovary* hispid at the top, styles short, distant. *Grain* narrow, grooved in front, adherent to the palea or not.—Species about 20, in all temp. climates.

The following arrangement and nomenclature of the Indian plants of this most puzzling genus is tentative only, and I cannot render these more worthy of confidence without undertaking a critical study of the whole genus. The characters given under the species must not be regarded as absolute, though founded on careful study of very large series of specimens; for the more of these that are studied, especially if they come from different localities, the more do exceptional characters and connecting forms present themselves. It would hence appear that all the members of the section *Eu-agropyrum* (perennials with dorsally convex not keeled fl. gls. to which all the Himalayan forms belong) will resolve themselves into a very few widely distributed species. A further difficulty is the distinguishing *Agropyrum* from *Elymus*, and indeed *E. sibiricus* from *A. longe-aristatum*, in which two plants the empty glumes are not placed side by side as in *Elymus* proper; added to which the spikelets are often solitary in *E. sibiricus*, and I think sometimes aggregated in *A. longe-aristatum*, var. *Aitchisoni*. *A. caninum*, Roem. & Sch.; Duthie Grass. N.W. Ind. 44, has according to Duthie's mss. been found at Simla, alt. 6500 ft., by Gamble; and by himself in Gangotri, alt. 10–11,000 ft. I have seen no specimens.

* *Spikelets awned.*

1. **A. longe-aristatum,** *Boiss. Fl. Orient.* i. 660; stems leafy, leaves flat or convolute, spikelets loosely imbricate flattened laterally 6–12-fld., I and II long or short 3–5-nerved, flg. gls. spreading linear-lanceolate 3–5-nerved towards the tip narrowed into a long usually recurved awn 1–1½ in. long. Brachypodium longearistatum, *Boiss. Diagn. Ser.* 1. vii. 127. *Griseb. in Goett. Nachr.* (1868) 73. Triticum longearistatum, *Jaub. & Sp. Ill. Pl. Orient.* ii. t. 199; *Steud. Syn. Gram.* 346. T. elymoides, *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 440; *Steud. l. c.*

Temperate Himalaya; from Kashmir to Kumaon, alt. 5500–13,000 ft. Eastern and Western Tibet, alt. 12–17,000 ft.—Distrib. Affghan, Persia, Abyssinia.

Stem 1–3 ft., stout or slender, erect or ascending from a tufted base. *Leaves* 6–10 by ⅛–⅙ in., rarely convolute, and sheaths smooth; ligule very short. *Spikes* 3–5 in., erect or nodding, or horizontal from the decurved top of a very slender peduncle, rarely ovoid and very dense-fld.; rachis slender, smooth; margins of hollows scaberulous or ciliolate. *Spikelets* sessile, remote or approximate, sometimes crowded and secund, ½–¾ in. long without the awns, green or blue-purple. *Gl.* I and II most variable in length, ¼–¾ the length of the lowest fl. gl., elliptic-ovate to narrowly setaceous, awned or not, tip sometimes notched on one side; flg. gls. narrowly lanceolate, smooth or scabrid, narrowed into a usually straight but sometimes recurved stout or slender scabrid awn, prominently 5-nerved above the middle rarely to the base, tip sometimes toothed unilaterally or on both sides of the awn; palea coriaceous, keels ciliolate with erect teeth above the middle. *Lodicules* hyaline, ciliate. *Anthers* short. *Grain* oblong, compressed.—Except by the long awns I am at a loss how to diagnose this variable grass, some states of which approach *Elymus sibiricus* so closely that I can hardly distinguish them. The following varieties are represented amongst Persian specimens. I do not find that they affect definite localities or elevations in the Himalaya.

1. Gl. I and II very short oblong-lanceolate acute or acuminate usually strongly 3-nerved, fl. gls. glabrous or nearly so except towards the tip.

2. Gl. I and II as in 1, fl. gl. scabrid more or less throughout.

3. Gl. I and II long setaceously lanceolate or lanceolate and long-awned, fl. gls. smooth or scabrid towards the tip.

4. Gl. I and II as in 3, fl. gls. scabrid more or less throughout.

2. **A. semicostatum,** *Nees ex Steud. Syn. Gram.* 346; tall, slender, leaves flat, spike elongate, spikelets distant 7–8-fld., gl. I and II linear-lanceolate acuminate smooth or scaberulous strongly 5–7-nerved, flg. rather longer erect lanceolate scaberulous above tip entire or 1–2-toothed and narrowed into a straight rarely recurved slender awn twice as long as itself or shorter. *Boiss. Fl. Orient.* v. 662; *Duthie Grass. N.W. Ind.* 45.

Temperate Himalaya; from Kashmir to Sikkim, alt. 6–11,000 ft. (as low as 3000 ft. in the Sutlej valley), *Thomson, Royle, Jacquemont,* &c.—Distrib. Affghan. Turkestan.

Stems 2–3 ft., tufted, erect, or longer, and up to 8 ft., then weak and inclined. *Leaves* narrow, rarely $\frac{1}{3}$ in. broad, acuminate, scaberulous or smooth; sheaths smooth; ligule very short. *Spikes* 3–8 in., rachis scabrid, slender or rather stout. *Spikelets* 1–2 in. including the awns, green; internodes of rachilla short; gls. scabrid as is the callus of the fl. gl.; empty gls. always large but very variable in size and nerves, $\frac{1}{4}$–$\frac{2}{3}$ in. long; flg. gls. erect and appressed, not at all spreading, tip toothed on one or both sides; awn rarely 1 in. long.—As suggested by Boissier this is very closely allied to *A. caninum.* In a specimen from Kashmir (*Duthie,* No. 12,651) named *semicostatum* by Hackel, the awns are upwards of an inch long and reflexed as in *longe-aristatum,* to which it may be referable.

Var. *Thomsoni,* Hook. f.; leaves hairy, sheaths villous with reversed hairs.—Kunawur, alt. 11–12,000 ft., *Thomson.*

3. **A. striatum,** *Nees ex Steud. Syn. Gram.* 346; tall, robust, leaves flat or involute, spikelets many large imbricating, gls. I and II linear-oblong or oblong-lanceolate as long as gl. III acute or obtuse very strongly 7–many-nerved, flg. gls. ovate-lanceolate 5-nerved puberulous or glabrous margins usually ciliate, tip notched or entire, awn straight longer or shorter than the gl. Triticum striatum, *Steud. l. c.*

Kashmir, alt. 8–12,000 ft., *Royle, Jacquemont,* &c.

Stem 2–4 ft., as thick as a goose's or swan's quill, or more slender. *Leaves* $\frac{1}{4}$–$\frac{2}{3}$ in. broad, scaberulous above. *Spike* 3–8 in., rachis stout, glabrous with ciliolate margins of the hollows or puberulous. *Spikelets* $\frac{1}{2}$–1 in. long, glumes not spreading; I and II subequal, very coriaceous, II $\frac{1}{3}$–$\frac{2}{3}$ in. long, deeply channelled when dry; tip sometimes notched or obliquely truncate.—Probably a gigantic form of *A. semicostatum* or *caninum.*

4. **A. Jacquemontii,** *Hook. f.*; dwarf, leaves filiform flexuous, sheaths hyaline silvery, spikelets 2–5 cuneately obovate, glumes spreading, I and II small lanceolate acuminate, II 3-nerved awned, fl. gls. lanceolate smooth 5-nerved above the middle narrowed into a slender recurved awn many times longer than itself. Bromus tataricus, *Jacquem. mss.*

Western Tibet; Bekar, *Jacquemont*; Nubra, alt. 17,000 ft., *Thomson*; plain N. of Kumaon, alt, 15,500 ft., *Strachey & Winterbottom*; Chimoreri, *Stoliczka.*

Stems 6–12 in., erect or ascending, densely tufted, thickened at the base and clothed with short shining sheaths. *Leaves* 1–3 in., convolute, glabrous, tip obtuse. *Spikelets* subterminal, close together, $\frac{1}{2}$–$\frac{3}{4}$ in. long without the awns, 4–6-fld.; rachilla smooth; gls. I and II $\frac{1}{6}$–$\frac{1}{4}$ in., margins hyaline, nerves very prominent; flg. with the outer pair of nerves marginal and produced to the base, the inner pair rarely reaching below the middle, tip sometimes 2-toothed; awn sometimes strongly recurved, rarely straight; palea obtuse, keels ciliolate. *Anthers* very small.—I

should have taken Jacquemont's mss. specific name for this species, had it not been that it was taken up by Munro for another plant. (See *Elymus sibiricus.*)

5. **A. Thomsoni,** *Hook. f.*; lower sheaths villous, spikelets many ovoid erect, glumes erecto-patent, I and II ovate-oblong acute or acuminate 5–7-nerved margins hyaline, flg. gls. silkily villous ovate-lanceolate narrowed into an erect slender awn twice as long as the gl. or shorter.

Western Himalaya, alt. 10–12,000 ft., from Kunawur and Piti, *Jacquemont, Thomson,* to Garwhal, *Strachey & Winterbottom, Duthie.*

Stem 2–3 ft., stout or slender, densely tufted. *Leaves* narrow, margins flat or involute, upper glabrous, lower more or less hairy. *Spikes* 3–6 in., rachis pubescent on the margins or all over. *Spikelets* $\frac{1}{2}$–$\frac{2}{3}$ in. without the awns, 5–7-fld.; internodes of rachilla short, scaberulous; gls. I and II with scaberulous nerves; II sometimes toothed at the tip and mucronate; flg. gls. faintly nerved; keels of palea ciliate.

** Spikelets awnless (or very shortly awned in Indian specimens).

6. **A. repens,** *Beauv. Agrost.* 102 (the Indian form); stem very slender, leaves narrow, spike slender, spikelets rather distant 5–6-fld. oblong quite glabrous, gls. I and II unequal linear or linear oblong obtuse acute or notched at the tip strongly 3–5-nerved margins scarious, II much shorter than III, flg. gls. linear obtuse or obliquely retuse or notched strongly 3–5-nerved in the upper half. *Reichb. Ic. Fl. Germ.* i. t. 20; *T. Nees Ic. Fl. Germ. Monocot.* i. n. 80; *Steud. Syn. Gram.* 343; *Ledeb. Fl. Ross.* iv. 341; ?*Boiss. Fl. Orient.* v. 663. A. acutum, *Roem. & Sch. Syst.* ii. 751; *Reichb. l. c.* t. 22. Triticum repens, *Linn. Sp. Pl.* 86; *Fl. Dan.* t. 748; *Host Gram. Austr.* ii. 27, t. 21; *Engl. Bot.* t. 909; *Knapp Gram. Britt.* t. 111; *Kunth Enum. Pl.* i. 440, *Suppl.* 261.

Kashmir, alt. 9–12,000 ft., *Duthie.* Western Tibet; Gilgit, alt. 8000 ft., *Giles*; Ladak, Zanskar and Karakoram, alt. 8–14,000 ft., *Thomson,* &c.

Stems 1–2 ft., densely tufted at the base, erect or ascending. *Leaves* flat, or convolute when dry, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, smooth, glabrous or puberulous above. *Spikes* 3–6 in., erect, rachis slender, margins of hollows quite glabrous. *Spikelets* $\frac{1}{2}$–$\frac{2}{3}$ in., very pale, internodes of rachilla short nearly glabrous; glumes rather spreading, calli quite glabrous; keels of palea smooth.—I follow Munro, Clarke and Hackel (in litt.) in referring this species to *A. repens,* though it differs much from Boissier's description of that species in the leaves not being scabrid, in the unequal glumes, of which I and II are much shorter than the flg. and in the latter not being lanceolate.

7. **A. dentatum,** *Hook. f.*; root creeping, leaves flat, spike slender, spikelets imbricating 3–5-fld. quite glabrous or sparsely pubescent, gls. I and II large subequal oblong obtuse obliquely truncate unidentate or mucronate rarely awned very strongly 7–9-nerved, fl. gls. linear-oblong obtuse acute or acuminate strongly 5-nerved above the middle.

Kashmir, alt. 9–12,000 ft., *Jacquemont, Thomson,* &c. Western Tibet, Karakoram, alt. 14,000 ft., *Clarke.*

Habit of *A. repens,* to which specimens have been referred by Munro and Clarke, but the spikelets (which are green or purplish) are closely imbricating, the margins of the hollows of the rachis scaberulous or ciliolate, the empty gl. much larger broader and as long as the flg. or nearly so and many-nerved.—Under No. 12,432 of Duthie's Kashmir collections I find along with typical *A. dentatum,* and

apparently from the same plant, a specimen with scaberulous leaves and sheaths, ovate-lanceolate acuminate shortly awned 3–5-nerved empty gls. and fewer pubescent acuminate shortly awned flg. gls.

Var. ?*elatum*, Hook. f.; stem 3–4 ft. stout, leaves ⅛ in. broad, empty gl. ⅓–½ in. long ovate-lanceolate acuminate shortly awned entire or notched on one side 5–7-nerved, fl. gls. narrowed into a short awn.—Kashmir; Dras, alt. 12–13,000 ft., *Thomson*.—Perhaps this had better be referred to *semicostatum* or *striatum*. It was placed in *repens* by Munro.

130. **HORDEUM**, *Linn.*

Erect annual, rarely perennial grasses. *Leaves* flat. *Spikelets* 1-fld., 2–3-nate in the hollows or at the nodes of a simple cylindric spike, the lateral often imperfect; rachilla jointed at the base of the fl. gl. and produced above it with sometimes an imperfect gl. *Glumes* I and II empty, very narrow, rigid, persistent, the outer of each cluster of spikelets often together resembling an involucre; III dorsally rounded, 5-nerved above, narrowed into an erect or recurved awn; palea 2-keeled. *Lodicules* 2, ciliate. *Stamens* 3. *Styles* very short. *Grain* grooved in front, tip usually villous, adherent to the palea or free.—Species about 12, natives of temperate regions.

* *Annuals.*

H. VULGARE, *Linn. Sp. Pl.* 84; spikelets 2–6-ranked, fl. gl. long-awned. *Beauv. Agrost.* 114, t. 21, f. 1; *Host Gram. Austr.* iii. 23, t. 34; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 83; *Steud. Syn. Gram.* 357; *Duthie Grass. N.W. Ind.* 45, *Fodd. Grass. N. Ind.* 69, t. F. f. 32; *Nees Agrost. Bras.* 455; *Wall. Cat.* n. 3789; *Hack. in Engl. & Prantl Pflanzenfam.* ii. 80; *Koern. & Wern. Handb. der Getreideb.* ii. 600. H. sativum, *Pers. Syn.* i. 108. H. coeleste, *Viborg*; *Wight Cat.* n. 1772.

Cultivated, chiefly in N. INDIA and up to 13,000 ft. in the Himalaya.

Var. *hexastichon*, Aitchis. Cat. Panjab. Pl. 171; spikelets 6-ranked, H. hexastichon *Linn. Sp. Pl.* 85; *Beauv. l. c.* 114 (hexastachyon); *Kunth l. c.* 455, *Suppl.* 368; *Host l. c.* iii. 24, t. 35; *Gærtn. Carp.* ii. 10, t. 81, f. 3; *Roxb. Fl. Ind.* i. 358; *Grah. Cat. Bomb. Pl.* 234; *Dalz. & Gibs. Bomb. Fl. Suppl.* 96; *Nees Agrost. Bras.* 455; *Steud. l. c.*

Var. *distichon*; spikelets 2-ranked. H. distichon, *Linn. l. c.* 85; *Host l. c.* 35, t. 36; *Kunth l. c.* i. 455, *Suppl.* 369, t. 37; *Gærtn. Carp.* ii. 10, t. 81, f. 3; *Ledeb. Fl. Ross.* iv. 327; *Nees Agrost. Bras.* 454; *Steud. l. c.* 351. Zeocriton disticum, *Beauv. Agrost.* 115.—Quetta, *Stocks* (cult.).

Var. *Ægiceras*, Aitchis. Cat. Panjab Pl. 171; spikelets 2-ranked, gl. III produced into a dilated 3-fid appendage with the lateral lobes deflexed. H. Aegiceras, *Royle Ill. Bot. Himal.* 418, t. 97; *Henslow in Hook. Kew Journ.* i. (1849) t. 2, 3; *Schlecht. in Bot. Zeit.* (1847) 768; *Lindl. Nat. Syst. Bot. Ed.* II. 372. H. coeleste *var.* trifurcatum, *Hort. Monsp.*; *Schlecht. in Linnæa*, xi. (1837) 543; *Ser. in Ann. Sc. Phys. & Nat. Soc. Agric. Lyon.* iv. *ex Bot. Zeit.* (1847) 768. H. heterostachyum, *Beauv. Agrost.* 114. H. himalayense, *var.* trifurcatum, *Hort. Monsp.*; *ex Irmisch in Linnæa*, xiii. (1839) 124, t. 4; *Steud. l. c.* 252. H. nepalense, *Sweet Hort. Brit. Ed.* I. 444. H. trifurcatum, *Fisch. & Mey. Ind. Sem. Hort. Petrop. fasc.* 3 (1837) 131; *Wender. in Flora* (1843) 233. H. vulgare, *var.* cornutum, *Schrad. in Linnæa*, xii. (1838) 471. H. vulgare, *var.* trifurcatum, *Koern. & Wern. l. c.* i. 170, t. 3, f. 26. Critho Aegiceras, *E. Mey. Ind. Sem. Hort. Regiom.* 1848, 5; *in Ann. Sc. Nat. Ser.* III. xi (1849) 253; *Linnæa*, xxiv. (1851) 195. Triticum hordeiforme, *Wall. ex Steud. Nomencl. Ed.* II. ii. 716.—Thibet Barley, *Hook. Lond. Journ.*

Bot. vii. (1843) 215.—Temp. and Alp. Himalaya, from Kashmir to Sikkim, Tibet and China.

Var. *nudum*; spikelets 2-ranked, grain free within the palea. H. nudum, *Arduini in Schult. Mant.* ii. 437. H. gymnodistichum, *Watt Dict. Econ. Prod. Ind.* iv. 274. H. distichum, *β. Kunth l. c.* i. 455; *Kew Bullet.* (1888) 271. H. coeleste, *Koern. et Wern. l. c.* i. 166, ii. 629. ?H. himalayense, *Rittig Beschr. Himal. Gerste* (1822), *ex Schult. Mant.* ii. 481.—Cult. up to 14,000 ft. with brown or often purplish spikes.

1. **H. spontaneum,** *C. Koch in Linnæa*, xxi. (1848) 430; tall, densely tufted, leaves flat finely acuminate, spike narrow rachis fragile, spikelets 2-ranked lateral stipitate male awnless, flg. gl. lanceolate plumosely ciliate, awn very long flattened. *Steud. Syn. Gram.* 351. H. ithaburense, *Boiss. Diagn. Ser.* I. xiii. 20; *Fl. Orient.* v. 687; *Aitchis. in Trans. Linn. Soc. Ser.* II. iii. 127. H. Decaisneanum, *Hort.*

British Beluchistan; Quetta, *Stocks.*—Distrib. Westwd. to Palestine.

Stems forming great clumps 3 ft. high, resembling cultivated barley, *Aitchis. l. c. Leaves* flaccid, narrowed into very long points; ligule short. *Spikes* 1½–3 in. *Spikelets* ½ in., pedicel flat with villous margins; gls. linear-oblong. *Awn* 4–8 in. —The only truly wild Barley of the cultivated type, most nearly allied to *vulgare* var. *distichon*, but differing in the villous spikelets and jointed fragile spike. Grisebach, however (*in Ledeb. Fl. Ross.* iv. 317) says under the cultivated *H. distichum*, that he has found the spike to be fragile in some of its forms.

2. **H. murinum,** *Linn. Sp. Pl.* 85; stems ascending leafy, spike stout subcylindric fragile dense-fld., spikelets 3-nate lateral male or neuter, fl. gl. lanceolate awned ciliate below or glabrous. *Fl. Dan.* t. 629; *Host Gram. Austr.* i. 25, t. 32; *Engl. Bot.* t. 1971; *Knapp Gram. Britt.* 104; *Reichb. Ic. Fl. Germ.* t. xi.; *T. Nees Gen. Fl. Germ. Monocot.* i. n. 83; *Kunth Enum. Pl.* i. 456, *Suppl.* 370; *Ledeb. Fl. Ross.* iv. 328; *Boiss. Fl. Orient.* v. 686; *Benth. Fl. Austral.* vii. 669; *Nees Agrost. Bras.* 453, *Fl. Afr. Austral.* 363; *Steud. Syn. Gram.* 352; *Duthie Grass. N.W. Ind.* 45. H. leporinum; *Link in Linnæa*, iv. (1835) 133. H. vaginatum, *C. Koch in Linnæa* xxi. (1848) 433; *Steud. l. c.* Triticum murale, *Salisb. Prodr.* 27. Zeocriton murinum, *Beauv. Agrost.* 125.

Kashmir; alt. 5–6000 ft., *Jacquemont, &c.* Peshawur, *Stewart.*—Distrib. Westwd. to the Atlantic.

Stem 6-18 in., ascending from an often decumbent base. *Leaves* flat, glabrous or sparsely puberulous and scaberulous; sheaths inflated; ligule small, scarious. *Spikes* 1–2½ by ½–⅔ in., inclined, green. *Spikelets* with the awns 1 in.; empty gl. filiform; flg. gl. flattened, much shorter than the straight awn; keels of palea ciliate.

** *Perennials.*

3. **H. secalinum,** *Schreb. Spicil. Fl. Lips.* 148; stem erect leafy, spike narrow subcylindric dense-fld., spikelets 3-nate lateral male or neuter. *Host Gram. Austr.* i. 26, t. 33; *Trin. Sp. Gram. Ic.* t. 3 & 4; *Benth. Fl. Austral.* vii. 669; *Boiss. Fl. Orient.* v. 687. H. pratense, *Huds. Fl. Angl. Ed.* II. 56; *Engl. Bot.* t. 409; *Trin. l. c.* t. 4; *Knapp Gram. Britt.* t. 105; *Reichb. Ic. Fl. Germ.* i. t. xi.; *Ledeb. Fl. Ross.* iv. 328; *Steud. Syn. Gram.* 352; *Duthie Grass. N.W. Ind.* 45. H. nodosum, *Linn. Sp. Pl. Ed.* II. 126 (*excl. Syn. Ray.*). H. brevisubulatum, *Link in Linnæa*, xvii. (1843) 391. H. maritimum, *Roth Tent. Fl. Germ.* II. i. 150; *Fl. Dan.* t. 630. Zeocriton secalinum, *Beauv. Agrost.* 115.

Kashmir & Iskardo, alt. 7700 ft., *Clarke, Duthie.* Western Tibet, alt. 10–15,000 ft., *Thomson.* Shibchilam (N. of Kumaon) alt. 15,000 ft., *Strachey & Winterbottom.*—Distrib. Europe, N. Asia, temp. N. & S. America.

Stems densely tufted, 3–6 in., stout or slender, often geniculate at the base. *Leaves* short, linear, flat, glabrous or hairy beneath; ligule small. *Spikes* 2–3½ by ⅙–⅓ in., erect or inclined; rachis subfragile, green or purplish. *Spikelets* densely crowded, sub hexastichous, ⅛–¼ in. long, awns longer or shorter than the gl.—Some of Dr. Thomson's Tibetan specimens are upwards of 3 ft. high with the stem nearly as thick as a goose-quill.

131. **ELYMUS,** *Linn.*

Characters of *Agropyrum*, but spikelets for the most part in pairs, threes, or fascicled in the nodes of the rachis, and empty gls. usually more or less collateral —Species about 20 enumerated, of N. and S. temperate regions.

Boissier (*Fl. Or.* v. 690) considers *Elymus* as too closely allied to *Hordeum*. To me it appears to be connected with *Agropyrum* through *E. sibiricus*, and *A. longe-aristatum*, in both which the empty glumes are opposite one another, not as in the other Indian *Elymi* placed more or less collaterally. It is as difficult to limit the species in one genus as in the other, and the more specimens one has of any species, the more difficult it is to limit it.

* *Awn of fl. gl. much longer than the gl.*

1. **E. sibiricus,** *Linn. Sp. Pl.* 3; spike short or elongate and flexuous, spikelets geminate and fascicled, empty gls. subopposite much shorter than the 5–7-fld. spikelet, fl. gls. lanceolate 5-nerved narrowed into a slender erect or recurved awn much longer than the gl. *Schreb. Gram.* i. t. 21, f. 1; *Kunth Enum. Pl.* i. 451, *Suppl.* 367; *Ledeb. Fl. Ross.* iv. 330; *Steud. Syn. Gram.* 348; *Duthie Grass. N.W. Ind.* 46. E. glaucus, *Buckl. in Proc. Acad. Sc. Philad.* 1862, 99. E. nutans, *Griseb. in Goett. Nachr.* (1868) 72. E. tener, *Linn. f. Suppl.* 114.

TEMPERATE & ALPINE HIMALAYA; from Kashmir to Sikkim, alt. 10–14,000 ft. EASTERN & WESTERN TIBET, alt. 10–15,000 ft. (15–18,000 ft., *Stoliczka*).—DISTRIB. Affghan., Abyssinia, N. Asia & America.

Stem 1–2 ft., densely tufted, ascending, smooth, erect inclined or decurved below the spike. *Leaves* ⅙–⅓ in. broad, nearly smooth; ligule very short. *Spike* very variable, 4–10 in. long, green or brownish, straight curved or flexuous; rachis smooth, or faintly scabrid, as are the margins of its hollows. *Spikelets* ½–1 in. long excluding the awns, sessile and pedicelled; rachilla slender, minutely scaberulous, its internodes long or short; gl. I and II most variable, II ¼–⅔ the length of the lowest fl. gl., from narrowly oblong to ovate-oblong lanceolate or almost setaceous, acute acuminate or both or II only awned, quite entire (never notched), usually strongly 3-nerved; fl. gls. narrowly lanceolate, narrowed into the awn, quite entire or tip toothed on one or both sides at the base of the awn, glabrous smooth or faintly scaberulous, 5-nerved usually to the base; awn ⅔–1 in.; palea linear, keels ciliate-toothed above the middle. *Lodicules* lacerate. *Anthers* short. *Ovary* pyriform, top hirsute; stigmas short.—A very abundant grass in Tibet and the higher Himalaya, states of which are with difficulty distinguished from *Agropyrum longe-aristatum* (which see), and just as variable, in the empty glumes especially, but the awns are usually shorter. A small very slender form with an inclined horizontal and upcurved spike of secund purplish spikelets is var. *minor* of Hackel (Duthie n. 13,745) and *Agropyrum longe-aristatum* var. *Aitchisoni* of Boiss. (Fl. Or. v. 660) and *Brachypodium tataricum*, Munro in Journ. Linn. Soc. xviii. (1881) 109.—Another variety (*Bromus dubius*, Jacquem. mss.) has oblong very dense short subcylindric spikes. It is a very alpine form, found at 15–18,000 ft. elevation in Eastern and Western Tibet.

2. **E. dahuricus**, *Turc. in Bull. Soc. Nat. Mosc.* (1838) 105, et xxix. I. (1867) 62; spike narrow strict or subflexuous, spikelets geminate 2–3-fld., empty gls. collateral linear-lanceolate acuminate or subaristate 5–7-nerved nearly as long as the spikelet, fl. gls. lanceolate scaberulous 5-nerved narrowed into a slender erect awn as long or twice as long as the gl. ?Hordeum sylvaticum, *Duthie Grass. N.W. Ind.* 45.

Kashmir, *Falconer, &c.*; Iskardo, *Clarke*, alt. 7500 ft.; Sind Valley, 6000 ft., *Gammie*. Western Tibet, alt. 11–14,000 ft., *Thomson*—Distrib. N. Asia.

Stem 2–3 ft., rather stout and leafy, or shorter more slender and leafy at the base chiefly. *Leaves* 3–8 by $\frac{1}{6}$–$\frac{1}{3}$ in., flat, finely acuminate, nearly smooth or scaberulous above; sheaths smooth; ligule very short. *Spike* 3–8 in.; rachis glabrous or nodes pubescent. *Spikelets* $\frac{1}{3}$–$\frac{1}{2}$ in. exclusive of the awns, green, imbricating; gl. I and II subequal, strongly 3–5-nerved, smooth or scaberulous, rarely toothed on one side towards the tip; fl. gls. lanceolate, more or less distinctly notched at the tip, 5-nerved, from nearly glabrous to scaberulous, and with minutely ciliolate nerves; awn $\frac{1}{3}$–$\frac{1}{2}$ in.; keels of obtuse palea strongly shortly ciliate. *Grain* oblong, dorsally compressed, concavo-convex, tip villous.

Var. ? more robust, spike stouter, spikelets large, $\frac{1}{2}$–$\frac{2}{3}$ in., more crowded, 3–5-fld., awns of fl. gl. $\frac{1}{2}$–$\frac{2}{3}$ in.—Karakoram, alt. 12,000 ft., *Clarke*.

** *Awn of fl. gl. much shorter than the gl.* I.

3. **E. dasystachys,** *Trin. in Ledeb. Fl. Alt.* i. 120, *Fl. Ross.* iv. 333, *Ic.* t. 249; spike stout strict, spikelets geminate 2–5-fld., empty gls. collateral unequal subulate-lanceolate 1–3-nerved aristately acuminate, II nearly as long as the lowest fl. gl., fl. gls. lanceolate more or less silky 5-nerved tip notched towards the subulate or shortly awned tip. *Steud. Syn. Gram.* 350; *Duthie Grass. N.W. Ind.* 46. E. jenisseensis, *Turc. in Bull. Soc. Nat. Mosc.* xxix. (1856) i. 64.

Kashmir & Kunawur, alt. 8–12,000 ft., *Jacquemont, Clarke, &c.* Western Tibet, alt. 10–14,000 ft., *Thomson, &c.* Laptal (N. of Kumaon) alt. 14,500 ft., *Strachey & Winterbottom.*—Distrib. Turkestan, Siberia.

Stem 2–5 ft., stout or slender. *Leaves* 6–12 in., flat and $\frac{1}{6}$–$\frac{1}{3}$ in. broad, or narrow with margins involute, smooth or scaberulous. *Spike* 6–8 in., variable in breadth; rachis stout, pubescent sparsely villous or nearly glabrous. *Spikelets* $\frac{1}{2}$ in. long; gl. I and II very narrow, 1- rarely 3-nerved; fl. gls. notched at the base of the awn on both sides, 5-nerved, rarely almost glabrous; keels of obtuse palea stoutly ciliate.

4. **E.? Thomsoni,** *Hook. f.*; spike stout strict, spikelets 2–3-nate densely crowded sessile and pedicelled, glumes all scarious (in frt.) broadly oblong or ovate-oblong with hyaline margins or very stout midrib and 7–9 fainter lateral nerves suddenly ending in a short stout awn.

Western Tibet; Danskar, in Piti, alt. 13,000 ft., *Thomson*.

Stem 12–14 in., very stout, erect. *Leaves* 3–6 in., narrow, convolute, coriaceous, smooth, finely acuminate, subpungent; sheaths broad, striate; ligule very short. *Spike* 3–4 in., rachis very stout, smooth or subsilky on the angles. *Spikelets* $\frac{1}{3}$–$\frac{1}{2}$ in., glabrous or faintly pubescent; rachilla very short and stout; glumes subpubescent, usually broadly notched below the awn often unequally, margins ciliolate, 7–9-nerved; palea very broad, pubescent, ciliate, 2-lobed, keels unequal more or less ciliate. *Grain* free, concavo-convex, top glabrous.—I have seen only two specimens of this plant, which resembles a wheat more than an *Elymus*, from which latter genus it differs in the free grain with a glabrous tip; both specimens are far advanced, and I doubt the grain being in a normal condition.

131.[1] **ASPERELLA,** *Humb.*

(Not in Clavis, p. 9.)

Tall perennial grasses. *Leaves* narrow, flat. *Spikelets* 1- or more-fld., 2–3-nate opposite hollows in the rachis of a terminal elongate simple slender spike, with the sides of the glumes opposite the rachis; rachilla jointed under the flg. gls. *Glumes* I and II 0, or in the lowest spikelets minute, subulate; flg. gls. rigid, lanceolate, convolute, narrowed into an awn, dorsally rounded, 5-nerved above the middle; palea 2-keeled. *Lodicules* 2, obovate or dimidiate-obovate, hairy. *Styles* very short, free, stigmas plumose. *Grain* narrowly oblong, ventrally grooved, adherent to the palea, tip villous.—Species 5, 1 Siberian, 2 American, 1 N. Zealand, and the following.

A. Duthiei, *Stapf in Hook. Ic. Pl. ined. f.*; spikelets 1-fld., rachilla produced.

Western Himalaya; Tihri-Garwhal; alt. 7–8000 ft., *Duthie.*—Distrib. China.

Stem 3 ft., glabrous. *Leaves* 10 by $\frac{3}{4}$ in. lanceolate, setaceously acuminate, thinly membranous, scabrid on both surfaces; sheaths elongate, nodes thinly villous; ligule truncate, minutely ciliolate. *Spike* 6 in., very slender, rachis pubescent. *Spikelets* $\frac{1}{3}$–$\frac{5}{12}$ in. long, nearly all 2-nate, pale; rachilla glabrous terminated by an awn; flg. gl. lanceolate, 7-nerved, narrowed into an awn almost twice as long as itself, nerves rough; palea about as long as the gl. *Lodicules* obovate, hairy.—Allied to *A. Hystrix*, Willd., and to *A. sibirica*, Trautv. differing from both in the 1-fld. spikelets. Foliage as in *A. Hystrix*, but spike not at all stiff. *A. sibirica* has narrower firmer leaves, more markedly nerved gls., and much shorter awns.—*Stapf.*

Tribe XI. Bambuseæ. (See p. 91.)

By J. S. Gamble, M.A., F.L.S., Conservator of Forests, N.-W. Provs.

The following account of the Indian *Bambuseæ* is drawn up, almost verbatim, from Mr. Gamble's "Bamboos of British India," which forms part of vol. vii. of Dr. King's "Annals of the Royal Botanic Gardens of Calcutta," and of which Dr. King favoured me with a copy in advance, together with his and Mr. Gamble's permission to reproduce its contents in a form suited to the "Flora of British India." In doing this I have been obliged to curtail the descriptions. And in order to preserve the arrangement of matter adopted in this work, I have had to substitute for the Keys to the species employed by Mr. Gamble, specific characters selected according to my judgment from his detailed descriptions; and in a few cases to substitute synonymous technical terms for those he has used. I have added nothing; for it is obvious that a botanist of Mr. Gamble's ability and wide experience of so many of the Indian Bamboos in their native forests, having access also to the unrivalled collections in the Herbarium of the Calcutta Gardens, should have exhausted the subject in so far as materials were available. It must not be supposed that this work supersedes his "Bamboos of British India," which is indispensable to the student of the tribe, by reason of its fuller descriptions, and admirable plates and analyses. My cordial thanks are directly due to Dr. King and Mr. Gamble for this generous contribution to the "Flora of British India," and indirectly for the authentically named collection of specimens corresponding to Mr. Gamble's descriptions, which has been presented by the Government of India to the Herbarium of the Royal Gardens, Kew.

Since the above was written, Mr. Freeman Mitford's "The Bamboo Garden" has appeared, a work replete with valuable observations upon the habit, mode of growth, and other characters of the hardy species of Bamboo (including 5 Indian) cultivated by him. In it is pointed out (see *Arundinaria Simoni*, p. 60) for the

first time the true characters of the two types of sheath and blade that occur in *Bambuseæ*, and which do not obtain, so far as I know, in any other tribe of grasses. In a communication which Mr. Mitford has been good enough to make to me on this subject, he has formulated his views as follows, and has kindly allowed me to introduce them here.

"The sheath is an organ playing so important a part in the life of the Bamboo that it deserves something more than a cursory notice. In the grasses generally the sheath is regarded by botanists as taking the place of the petiole of the leaf. It happens, however, that the leaves of most Bamboos—indeed of all the hardy Bamboos—have a distinct continuation of the midrib of the leaf attaching it to the sheath and articulated, which continuation might perhaps be correctly termed a petiolule. The Bamboos, as it appears, bear sheaths of two types. There is first of all the series of sheaths which, borne one on each node and wrapped tightly round the culm or branch, as the case may be, protect it during growth. This form of sheath is divided or split transversely into two members, the ligule and the limbus or blade, the latter being what I would term a pseudophyll, or false leaf, sessile, lacking both midrib and petiole, varying in size in the different species, but always the first part to wither and disappear. In some Bamboos—those of the *Phyllostachys* group—this sheath falls away as soon as branching takes place; in others, of the *Arundinaria* group, it remains, and having guarded the tender growth of the parent culm or branch it springs aside with the young branches or branchlets, devoting the remainder of its life to their protection until they can stand alone.

"Then there is the second form of sheath bearing a true leaf with petiole and midrib. This is the form assumed by the two, three, or four sheaths at the top of each culm branch and branchlet above the topmost node where branching ends. This true leaf is persistent upon the sheath. The ligule is present, as in the first type, but the deciduous pseudophyll is replaced by an evergreen leaf.

"An interesting question arises as to whether there is any transition stage between the two types of blade, or whether the change is always sudden. I think that in many Bamboos I can trace such a transition stage; that is to say, that each successive pseudophyll on the stem becomes more and more like a true leaf, something of the nature of an arrested midrib being perceptible in the pseudophylls which are found near the top of the culm, though it is not until the last branching node has been passed that the true leaf-bearing sheaths occur. The principle remains inviolate (throughout the hardy species at any rate), and the distinction between the two classes of sheaths is absolutely maintained."—A. B. F. M.

I would remark in conclusion that Mr. Mitford's observations, extending to the nervation of the leaves of Bamboos, lead him to the conclusion that of those cultivated by him in the open air in the middle of England, the truly hardy only have tessellated leaves; the tender, such as *Arundinaria Falconeri* and *falcata*, having very inconspicuous transverse nervules, or none.—J. D. H.

Subtribe I. ARUNDINARIEÆ. (See p. 91.)

132. **ARUNDINARIA**, *Michx.*

Erect or climbing shrubs. *Stems* slender, nodes usually prominent, internodes rather short, branches short fascicled. *Stem-sheaths* papery, straw-colrd., blade subulate. *Leaves* usually small, jointed on the sheath. *Infl.* on separate stems, or terminal, or on leafing branches. *Spikelets* 1– many-fld., compressed, usually all bisexual, except sometimes the terminal, often sheathed; empty gls. 2, unequal, membranous; flg. gls. longer, obtuse acute or mucronate, many-nerved; palea 2-keeled. *Lodicules* 3, ciliate. *Stamens* 3, rarely up to 6. *Ovary* globose above; style short, stigmas 2–3 plumose. *Grain* ovoid or narrowly oblong, dorsally furrowed, included in the gl. and palea.—Species about 50, 14 American, 1 African, the rest Asiatic.

A. Species of which the flowers are known.

Sect. 1. Erect shrubs; infl. on leafy branches; bracts of infl. small. *Stamens* 3.

* Nodes of stem not spinous. See also *A. Pantlingi*.

† *Spikelets many, in large terminal panicles.*

1. **A. Walkeriana,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 21; leaves shortly stoutly petioled thick elliptic to oblong-lanceolate pungent acuminate tessellate base rounded margins cartilaginous recurved spinulose-serrate. *Bedd. Fl. Sylv., Forest. Man. p.* ccxxx.; *Gamble Bamb. Brit. Ind.* 3, t. 1; *Trim. Cat. Ceyl. Pl.* 110.

Travancore; Pulney Hills, *Beddome.* Ceylon; *Walker, Thwaites.*

Stems 1 in. diam., thickly clothed above with sheaths of fallen leaves, internodes about 15 in. *Leaves* 5–11 by 1–1½ in., base cucullate, midrib narrow, nerves 6–10 pairs; sheath glabrous, mouth truncate ciliate, margin with curved bristles; ligule short. *Panicle* 6–12 in., red-purple, branchlets filiform, lower axils glandular and upper sparsely hairy. *Spikelets* up to 1 in. when mature, narrow, glabrous, 3–4-fld.; rachilla flattened, ciliate; gl. I and II subequal $\frac{1}{10}$–$\frac{1}{5}$ in., I usually 3-nerved; II, 5-or more-nerved, apiculate, ciliate; flg. gls. larger, with 2 prominent nerves and intermediate finer ones; keels of palea ciliate.—Probably flowers frequently.

2. **A. Wightiana,** *Nees in Linnæa*, ix. (1834) 482; shrubby, slender, leaves thin shortly petioled long-acuminate tessellate base rounded or narrowed margins incurved scabrid, spikelets 3–5-fld. in dense leafy spreading panicles long-pedicelled, fl. gls. obtuse. *Rupr. Bamb.* 26, t. 3, f. 10; *Munro in Trans. Linn. Soc.* xxvi. (1868) 19; *Bedd. Fl. Sylv., Forest. Man. p.* ccxxx., *Anal. Gen.* t. 28; *Brandis For. Fl.* 563; *Steud. Syn. Gram.* 335; *Thw. Enum. Pl. Zeyl.* 444; *Gamble Bamb. Brit. Ind.* 4, t. 2.

Malabar & Travancor, alt. 6–8600 ft., *Wight*, &c. Ceylon; Pedrotallagalla, alt. 8000 ft., *Thwaites* (CP. 3860).

Gregarious, rhizomes branching. *Stems* 6–10 ft., or higher; nodes swollen, girt with a hairy ring; internodes 10–14 in., usually flattened on one side and rough, young strongly striate; branchlets whorled. *Stem-sheaths* 4–8 by 1–3 in., narrowed slightly upwards, base hispid with golden tubercle-based hairs, limb 1–1½ in., subulate, scabrid. *Leaves* 5–7 by ¾–1 in., glabrous above, glaucescent beneath, midrib usually glandular-pubescent, nerves 5–7 pairs; sheaths striate, keeled, often purple, sometimes hispid with tubercle-based hairs, mouth 5–8-setose, margins ciliate; ligule short, obtuse. *Spikelets* 3–5-fld., purple, glabrous or scabridly hirsute; gls. I and II ovate, acute; I 5– II 7-nerved; fl. gls. ovate, 9–11-nerved, mucronate, scabrously hispid; palea 2-cuspidate, 3-nerved and transversely nervuled, keels ciliate.—Flowers annually.

Var. β. *hispida*, Gamble l. c.; leaf-sheaths and stems thickly clothed with tubercle-based golden hairs, internodes more flattened on one side. A. hispida, *Steud. l. c.* A. moliniformis, *Hochst. in Herb. Hohenack.* n. 1282.

3. **A. floribunda,** *Thw. Enum. Pl. Zeyl.* 375; internodes retrorsely hirsute, leaves thin lanceolate acuminate spinulose-serrate tessellate narrowed into a very short 2-glandular petiole, spikelets 5–8-fld. minutely silkily pubescent, fl. gls. acuminate. *Munro in Trans. Linn. Soc.* xxvi. (1868) 20; *Beddome Fl. Sylv., Forest. Man. p.* ccxxx.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 6, t. 3.

Ceylon; Maturatte district, alt. 5000 ft., *Thwaites* (CP. n. 2624).

Stems 2–5 ft., erect; internodes 2–4 in. *Leaves* glabrous, primary nerves 3–4 pairs; sheath sometimes hispid with tubercle-based hairs, ending in a ciliate mem-

brane below the petiole and short auricles with 5–8 twisted bristles; ligule short. *Panicle* large, with slender filiform branches appressed at first, axils glandular. *Spikelets* about 1 in., gl. I $\frac{1}{10}$–$\frac{1}{5}$ in., acute, 3-nerved, tip ciliate; II longer, more nerved; fl. gls. 3 in., acuminate, 7–9-nerved, tip ciliate; keels of palea ciliate; grain $\frac{1}{5}$ in., red.

†† *Spikelets few, in short panicles.*

4. **A. elegans,** *Kurz in Journ. As. Soc. Beng.* xlii. (1873) 248; *For. Fl. Burma*, ii. 549; stems slender, internodes smooth, leaves linear-lanceolate long acuminate tessellately nerved, margins cartilaginous scabrid, spikelets long 7–8-fld. in a terminal interrupted panicle or raceme pedicelled flattened, fl. gls. distant acuminate. *Gamble Bamb. Brit. Ind.* 6, t. 4.

Upper Assam; Naga Hills, alt. 5500 ft., *Rollo.* Burma, Poneshee, *J. Anderson*; Tenasserim and Martaban, alt. 5–7500 ft., *Kurz*, &c.

Stems 12–20 ft. high by $\frac{3}{10}$–$\frac{8}{10}$ in. diam.; internodes 7–9 in., flattened on one side, smooth; sheaths $\frac{1}{3}$ the length of the internodes, papery, hispidulous, upper $\frac{1}{3}$ narrowed to a truncate minutely auricled mouth; blade subulate, recurved. *Leaves* 4–5 by $\frac{3}{10}$–$\frac{1}{2}$ in., base narrowed into a very short petiole, midrib yellow, primary nerves 4–6 pairs; sheath smooth, striate, tipped with a ciliate callus, auricles bristly; ligule very short. *Spikelets* 1 in. or more; gl. I and II $\frac{1}{5}$ in., ovate, acuminate, 3–5-nerved, keel ciliate; fl. gls. similar, 7-nerved and transversely nervuled; palea obovate, 2-fid, 2-nerved between the white-ciliate keels and 1-nerved on each side of them.

5. **A. polystachya,** *Kurz ex Gamble Bamb. Brit. Ind.* 7. t. 5; stems soft, leaves thin soft lanceolate acuminate with a twisted tip rough above white hairy or smooth beneath not or rarely tessellately nerved margins scabrous ligule long, spikelets long 4–6-fld. in a large terminal or axillary racemose leafy panicle with papery bracts, fl. gls. distant ovate long-acuminate.

Sikkim Himalaya & the Khasia Hills, alt. 3–5000 ft., *Griffith, Kurz, Mann*, &c.

A small shrubby bamboo; *stem-sheaths* unknown. *Leaves* 4–8 by $\frac{7}{10}$–1 in., base rounded or narrowed, petiole very short, midrib rather broad, principal nerves 5 pairs, with lines of pellucid glands between the secondary, transverse nervules few or 0; sheath greenish yellow, striate, glabrous, ending in a broad 2-fid callus, and produced upwards to meet the long striate obtuse fimbriate ligule. *Spikelets* $\frac{1}{2}$–$\frac{7}{10}$ in., rachilla clavate; gls. I and II ovate, acuminate, 5–7-nerved, keeled and ciliate above; fl. gls. about twice as long, 7–9-nerved, ciliate; palea longer, mucronate, tip 2-fid, 1-nerved between and 1-nerved on each side of the ciliate keels.

6. **A. debilis,** *Thw. Enum. Pl. Zeyl.* 375; shrubby, stems much branched, leaves small linear-lanceolate acute obscurely or not tessellate tip scabrous base acute or subtruncate, ligule short, spikelets short 3-fld., shortly pedicelled in a terminal short leafy panicle, fl. gls. imbricating ovate mucronate. *Munro in Trans. Linn. Soc.* xxvi. (1868) 24; *Bedd. Fl. Sylv., Forest. Man. p.* ccxxx.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 7, t. 6.

Ceylon; Central Province, alt. 6–8000 ft., *Thwaites*, &c. (C.P. n. 1).

Stems elongate; nodes rather enlarged, internodes 2–6 in. by $\frac{1}{5}$–$\frac{8}{10}$ in. diam., upper smooth yellow shining, lower glabrous or top hispid with long hairs. *Leaves* $1\frac{1}{2}$–3 by $\frac{1}{5}$–$\frac{1}{3}$ in., glaucous, glabrous, or hairy above glabrous beneath, one or both margins scabrous; midrib thick, primary nerves 2–3 pairs, obscure, transverse

nervules obscure or 0; sheath glabrous, striate, paleaceous, ending in a ciliate callus and shortly auricled, with 2–4 short bristles. *Spikelets* ½ in., pedicels often obcuneate, glabrous or slightly pubescent; gls. I and II ovate, mucronate, 5–7-nerved; fl. gls. similar but longer; palea 2-cuspidate, hirsute, tip ciliate, keels smooth.

††† *Spikelets racemose.*

7. **A. densifolia,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 32; small, densely gregarious, leaves leathery densely imbricate subsessile lanceolate acute or long-acuminate spinulose-serrate tessellately nerved, base rounded or cordate, spikelets 1-fld. in a dense panicle of leafy branchlets bearing racemes of 5–6 spikelets, fl. gl. long-mucronate. *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 8, t. 7.

TRAVANCOR; on the Anamallay Hills, alt. 8500 ft., *Beddome.* CEYLON; Horton Plains, alt. 7200 ft., and Pedrotallagalla, *G. Thomson, Maxwell, Trimen,* &c.

Stem 6 in.–3 ft., with stiff strong leafy branches arising from a thick scaly rhizome; internodes 1½–3 in. by ⅛ in. diam. or less, smooth, walls rather thick; stem-sheaths 1 in. or longer, striate, hirsute, narrowed to the truncate acutely 2-auricled top; blade short, ovate. *Leaves* 1–1½ by ⅕–⅓ in., tip glabrous, margins broadly cartilaginous, midrib thick, primary nerves 1–2 obscure, secondary 4–5 regularly tessellate with nervules; sheath striate, ciliate with whitish stiff hairs above; ligule short, rounded, hairy. *Spikelets* $\frac{4}{10}$–½ in., rachilla glabrous; gl. I short, lanceolate; II broader, 5-nerved, keel scabrous; palea 2-mucronate, with a faint nerve outside each scabrid keel. *Lodicules* obovate, fimbriate. *Anthers* long. *Ovary* ellipsoid.

8. **A. racemosa,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 17; stem erect from a long rhizome, internodes scabrous, leaves linear-lanceolate tessellate tip setaceous, margins scabrous-serrulate, spikelets 4–8-fld. on short racemes of a simple terminal panicle of close leafy whorled branches surrounded by persistent sheaths, flg. gls. caudate-acuminate from a broad base ciliate. *Gamble Bamb. Brit. Ind.* 9, t. 8; *Mitford, The Bamboo Garden,* 174. A. Gammieana, *Gamble mss.* (an Alpine form).

E. NEPAL and SIKKIM, alt. 6–12,000 ft.

Stems 5–15 ft. by $\frac{7}{10}$–2 in. diam., walls thin, nodes a mere ring; internodes 12–15 in., blue-green when young; branches fascicled at the nodes; stem-sheaths usually 10 in., striate, covered with scattered stiff black hairs, narrowed convexly to the truncate tip; blade subulate, reflexed. *Leaves* 4–7 by ½–⅔ in., base rounded or narrowed into the very short petiole, glabrous or sparsely hairy above, midrib prominent, primary nerves 3–5 pairs, secondary 5–7, transverse nervules conspicuous; sheath 2-auricled with a ciliate membrane below the blade; ligule short, obtuse. *Panicle* with a glabrous rachis, pedicels 1–1½ in., wavy, angular. *Spikelets* 1–1½ in., rachilla clavate; gl. I and II very small, distant, acuminate; flg. gls. 7–9-nerved, setaceous, tip scabrid; palea shorter, 2-mucronate, tip scabrous, keels ciliate, nerves 0 or obscure.—Flowers rarely and only in the higher elevations, when the stem is sometimes reddish.

** Nodes of stem spinous (except *A. Pantlingi*).

9. **A. Griffithiana,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 20; gregarious, internodes furrowed, nodes girt with a ring of tawny hairs, leaves thin linear-lanceolate acuminate tessellate margins smooth, tips setaceous, spikelets 4–6-fld. in whorled clusters on a terminal panicle which is surrounded by sheathing bracts, pedicels hairy, flg. gls. lanceolate long-mucronate. *Gamble Bamb. Brit. Ind.* 10, t. 9.

BRITISH BHUTAN, *Pantling.* KHASIA and JAINTEA HILLS, alt. 3 4500 ft., *Griffith,* &c.

Stems 10–30 ft. by 1–1½ in. diam., olive-green; spines short, stout; internodes

7–9 in., stem-sheaths 6–9 in. by 4–5 in. broad at the base and $\frac{3}{10}$ in. at the top, with a basal belt of thick soft tawny hairs, narrowed upwards, tip with rounded auricles, thinly covered with stiff tubercle-based hairs; blade $\frac{1}{5}$ in., triangular, acute, hairy. *Leaves* 4–5 by $\frac{1}{2}$ in. or less, narrowed into a petiole, margins smooth, midrib shining, primary nerves 4–5 pairs, transverse nervules strong; sheaths striate, glabrous, ending in a narrow ring with a few stiff curved bristles; ligule rather broad, hairy. *Panicle* with a hairy rachis, laterally flattened. *Spikelets* 1–1½ in., narrow; rachilla long, flattened, top clavate, ciliate; gls. I and II ovate-lanceolate, mucronate, 5–7-nerved, scabrous, dorsally hairy above; fl. gls. $\frac{1}{2}$ in., scabrous, hairy above, 7-nerved; palea 2-mucronate, keels ciliate. *Anthers* with bearded tips.—Only once seen in flower.

10. **A. Pantlingi,** *Gamble Bamb. Brit. Ind.* 129, t. 118; tall, spines 0? nodes with a hairy ring, leaves lanceolate petioled tessellate smooth above scabrid on one margin, tip long twisted scabrid, spikelets panicled surrounded by sheathing bracts, pedicels glabrous capillary, nodes glandular, spikelets very narrow curved 6–10-fld., rachilla clavate with a tuft of white hairs beneath the ovate acuminate long-mucronate flg. gls.

British Bhotan; on Rechi La, alt. 11,000 ft., *Pantling.*

Stems upwards of $\frac{1}{2}$ in. diam., smooth; internodes 7–8 in. or more, cavity large; stem-sheaths about 10 in., smooth, striate, tapering to a convex top, margins long-ciliate; blade 3–4 by $\frac{1}{5}$–$\frac{1}{3}$ in., glabrous, decurrent on the sheath into hairy auricles bearing 6–10 long curved bristles; ligule about $\frac{1}{10}$ in., toothed, faintly ciliate, dorsally pubescent. *Leaves* 5–7 by $\frac{1}{2}$–$\frac{3}{4}$ in., base narrowed, petiole $\frac{1}{5}$–$\frac{1}{3}$ in., midrib narrow pale shining, nerves 4–5 pairs with 7–9 intermediate pairs, cross-nervules very many, sheath glabrous, ending in a very hairy ring with a few twisted bristles, margins long-ciliate; ligule dorsally pubescent. *Panicles* 4–6 in., terminal and axillary on leafless branches; bracts like small stem-sheaths, glabrous. *Spikelets* 2 in. or more, subverticillate; uppermost flg. gls. usually empty; rachilla about $\frac{1}{3}$ in., white-pubescent; gls. I and II empty, I $\frac{1}{5}$ in.; II nearly $\frac{1}{2}$ in., 3–5-nerved, subciliate; flg. gls. prominently 7-nerved, keels scabrid; palea with 2-ciliate keels alternating with 3 nerves, tip 2-fid and 2-mucronate. *Lodicules* 3, ovate or obovate, acute, ciliate. *Anthers* linear, acute. *Ovary* glabrous, style short; stigmas 3, long, plumose. *Grain* oblong, dark brown, grooved, tipped with the style-base.—Differs from *A. Griffithiana* in wanting spines, in the different stem-sheaths, large leaves, longer spikelets, and glabrous anther tips.

11. **A. callosa,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 30; internodes smooth, nodes girt by the base of the fallen sheath, leaves thin oblong-lanceolate acuminate tessellate glandular-scabrid above pubescent beneath, margins scabrous-serrulate, spikelets bracteate 6–12-fld. in a branched axillary panicle ending in a leafy branchlet, flg. gls. ovate acute mucronate. *Gamble Bamb. Brit. Ind.* 12, t. 10.

Eastern Himalaya; in the Duphla Hills, alt. 4500–6800 ft., *Lister.* Khasia Hills, alt. 6000 ft., *J. D. H. & T. T.*, &c.

Stem 12–20 ft. by ½–1 in. diam., smooth; nodes spinous and with a ring of soft brown hairs; internodes 6–10 in., walls above the spinous thickened nodes thin; stem-sheaths as long as the internodes or longer, thin, transversely nerved, narrowed from a softly hairy base to a narrow truncate tip; blade ½–1 in., subulate, hairy on both surfaces, auricles short fringed decurrent. *Leaves* 8–9 by $\frac{1}{3}$–1$\frac{1}{3}$ in., narrowed from a suboblique base to the very short petiole, tip scabrous, midrib hairy shining above, primary nerves 5–8 pairs, transverse nervules raised beneath with interposed pellucid glands; sheath densely tawny-pubescent, at length glabrous, tip with a ciliate callus and a few stiff curved bristles; ligule short, hairy. *Panicle* with the rachis striate, flattened on one side, and with a pubescent vertical line, terminal joints clavate, hairy; bracts narrow, straw-colrd. *Spikelets* 2–3 in., rachilla very

prominent, glabrous; gl. I and II short, ovate, acute, glabrous, 1–3-nerved; flg gls. ovate, 3–7-nerved, tip ciliate; palea acute, thickly pubescent, keels ciliate. *Anthers* short, obtuse.

Sect. II. Erect shrubs. *Infl.* of fascicled racemes on leafless or on both leafy and leafless stems; bracts small.

12. **A. falcata,** *Nees in Linnæa*, ix. (1834) 478; stems annual, internodes smooth, nodes swollen, leaves small linear shortly petioled scabrid glandular between the nerves, above not tessellate tip setaceous twisted, infl. of fascicled falcate racemes at the nodes, bracts short narrow membranous, flg. gls. 1–2 subacute mucronate 7–9-nerved, tips ciliate. *Gamble Bamb. Brit. Ind.* 12, t. 11, 12; *Mitford, The Bamboo Garden*, 167. ? A. utilis, *Clegh. in Journ. Agr. Hort. Soc. Ind.* xiii. (1865) 388.

WESTERN HIMALAYA; from the Ravi to Nepal, alt. 4–12,000 ft. (rarely over 7000 ft.).

Stems 6–10 ft. from a woody rootstock, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., green, sometimes pruinose; nodes glabrous or hirsute; internodes 6–12 in., walls thin; stem-sheaths papery, often 12 by 3 in., glabrous and scaberulous above, hairy beneath above the middle, margins ciliate, tapering to a truncate tip; blade $\frac{1}{2}$–2 in. by $\frac{1}{10}$ in., subulate recurved; ligule often $\frac{1}{2}$ in., toothed. *Leaves* about 3–4 by $\frac{1}{5}$–$\frac{1}{3}$ in., or 12 by 1 in. on young shoots, glands in rows like nervules pellucid; sheath glabrous; ligule long. *Panicles* on separate stems. *Spikelets* $\frac{1}{2}$–$\frac{2}{3}$ in.; rachilla cuneate, tip hairy; gl. I $\frac{1}{3}$ in., 3–5-nerved; II longer, 7–9-nerved, tip acute ciliate; fl. gls. $\frac{1}{2}$ in., mucronate, scabrous; palea = fl. gl. or rather longer (margins of gl. and palea often black).—There are two vars.: *α. typica*, Gamble, spikelets distant in filiform falcate racemes; *β. glomerata*, Gamble, spikelets 3–4 together in close racemes or panicles.—*A. utilis*, Clegh., may be *falcata* or *spathiflora*.

13. **A. khasiana,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 28; stems annual, dark green or blackish, nodes prominent, branchlets fascicled dark colrd., leaves 3–4 by $\frac{1}{3}$ in. linear-lanceolate glandular between the nerves not or hardly tessellate, infl. of fascicled falcate geniculate panicles at the nodes, bracts short ovate, fl. gl. mucronate, margins above and tip ciliate. *Gamble Bamb. Brit. Ind.* 15, t. 13.

KHASIA HILLS; alt. 5–6000 ft., common.

Most difficult to separate from *A. falcata*, but a stiffer stronger plant, panicle more dense and imbricated, flowers shorter, rachilla of spikelet hairy.

14. **A. intermedia,** *Munro in Trans. Linn. Soc.* xvi. (1868) 28; stems 8–12 ft. slender, nodes swollen with a prominent ring and whitish line below them, leaves very variable 8 by 1 in. (in young shoots to 3–4 by $\frac{1}{2}$ in.) linear- or oblong-lanceolate setaceously acuminate, base narrowed into a swollen petiole, nerves 3–7 pairs with 6–7 intermediates, sparingly tessellate with interposed pellucid glands, sheath ciliate with falcate auricles, infl. of whorled racemose panicles, bracts axillary triangular, spikelets 3–5-fld., fl. gls. 7–9- nerved. *Gamble Bamb. Brit. Ind.* 15, t. 14.

SIKKIM HIMALAYA, alt. 4–7000 ft., *J. D. H.*, &c.

Stems greyish-green; internodes 5–10 in, walls $\frac{1}{10}$–$\frac{1}{5}$ in. thick; stem-sheaths 8–10 by 1–2 in. at base, glabrous, striate, narrowed upwards and truncate, ciliate below the small subulate blade. *Leaves* bright green, upper surface and margins scabrid, midrib prominent; sheath with long marginal hairs, a minute ciliate callus below the petiole and on each side a falcate auricle bordered by stiff curved bristles; ligule long. *Infl.* on leafless stems. *Spikelets* $\frac{1}{2}$–1 in., yellow or purplish, nodes of rachilla clavate long-ciliate; gl. I and II ovate, membranous.—The long ciliate leaf-sheath is an excellent character.

15. **A. Hookeriana,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 29; stems 15–20 ft. slender, nodes not much swollen ringed by the base of the sheath, leaves 6–12 by $\frac{1}{2}$–$1\frac{1}{2}$ in. narrowed into a swollen petiole, nerves 4–8 pairs with oblique transverse pellucid glands not tessellate, sheath glabrous minutely ciliate, ligule long, infl. of loosely fascicled falcate bracteate panicles, spikelets drooping 1-fld., fl. gl. large broadly ovate 3-nerved. *Gamble Bamb. Brit. Ind.* 17, t. 15.

EASTERN HIMALAYA, alt. 4–7000 ft.; Sikkim and W. Bhotan, *J. D. H., Gammie,* &c.

Stems 15–20 coespitose, glaucous green, with white scurf when young; older internodes 8 by $\frac{2}{3}$–$1\frac{1}{2}$ in., with a dark blueish ring at the top, often striped green and yellow, walls $\frac{1}{10}$ in. thick; stem-sheaths often 12–24 in. by 3–6 in. broad at the base, narrowed upwards and truncate; blade 3–6 in., linear; ligule $\frac{1}{10}$–$\frac{1}{5}$ in., depressed in the middle. *Leaves* glaucous green when young, upper surface and margins scabrid; sheath ending in a broad callus and thin naked membrane. *Infl.* loose, on separate stems. *Spikelets* about $\frac{1}{3}$ in., pedicelled; gl. I $\frac{1}{10}$ in., 3-nerved, tip hairy; II $\frac{1}{5}$ in. 5-nerved, mucronate; fl. gl. hard, involute, angled, scabrous between the nerves; palea glabrous, tip hirsute. *Grain* ellipsoid.

Sect. III. Erect shrubs. Inflorescence usually in leafy panicles; bracts large.

16. **A. spathiflora,** *Trin. in Mem. Acad. Petersb. Ser.* VI. iii. II. (1835) 617, *Sp. Gram. Ic.* t. 350; stem-sheaths oblong tip rounded, leaves 2–4 at the end of the branches, 3–5 by $\frac{1}{3}$–$\frac{1}{2}$ in. linear-lanceolate tessellate, sheath loose, bracts enclosing 2–3 compressed 4–8-fld. spikelets, gl. I short obtuse, II long-mucronate, flg. gls. 4–5 ovate long-acuminate, palea very short. *Ruprecht. Bamb.* 24, t. 2, f. 5; *Steud. Syn. Gram.* 334; *Brandis in Ind. Forester,* xii. 206; *Gamble Bamb. Brit. Ind.* 17, t. 16; *Mitford, The Bamboo Garden,* 172. A. procera, *Wall. mss.* Thamnocalamus spathiflorus, *Munro in Trans. Linn. Soc.* xxvi. (1868) 34, *partly*; *Brandis For. Flor.* 563. Bambusa macro, *Wall. in Herb. Hook.* (*ex Munro*).—*Gen. Nov. Wall. Cat.* n. 5041.

WESTERN HIMALAYA; from the Sutlej to Nepal, alt. 7–9000 ft., *Wallich,* &c.

A gregarious shrub 12–20 ft. high. *Stem* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., smooth, young glaucous green and scurfy, older yellow or reddish-brown, nodes prominent, internodes 6–15 in., branchlets chiefly from the upper nodes, leafing branches with loose yellow sheaths 3–5 by $\frac{1}{3}$–$\frac{2}{3}$ in. *Stem-sheaths* loose, glabrous, margins ciliate, mouth $\frac{1}{2}$–$\frac{3}{4}$ in. broad, with a few stiff bristles; ligule $\frac{1}{10}$ in., fimbriate. *Leaves* shortly petioled, base narrowed, tip acute hairy; sheath 2–3 in., truncate, auricles bristly callus narrow, ciliate; ligule long-ciliate. *Infl.* usually on leafless stems, branches fascicled drooping, with narrow papery sheaths, $1\frac{1}{2}$–3 in. long. *Spikelets* 1–$2\frac{1}{2}$ in., pedicelled; rachilla long, clavate, tip hairy; gl. I and II linear-lanceolate, glabrous; fl. gls. $\frac{1}{2}$–1 in. scabrous.—Distinguished from *A. falcata* by the tessellate leaves, and from *jaunsarensis* by the short rhizomes and tufted habit.

17. **A. aristata,** *Gamble Bamb. Brit. Ind.* 18, t. 17; stem-sheaths narrowed to a broad rounded top, leaves fascicled on jointed purple branchlets oblong-lanceolate tessellate, sheath loose keeled with a thickened spongy callus below the petiole, bracts of infl. broad enclosing 3–5 compressed 4–8-fld. spikelets, gl. I and II oblong-lanceolate scabrous 5–7-nerved, fl. gls. ovate long acuminate, palea nearly as long. Thamnocalamus spathiflorus, *Munro in Trans. Linn. Soc.* xxvi. (1868) 34, *partly.*

SIKKIM and BHOTAN HIMALAYA, alt. 9500–11,000 ft., *Griffith's Collectors, Kurz*, &c.

A gregarious shrub 8–12 ft. high, very closely allied to *A. spathiflora*, of which it is the Eastern representative, distinguished from that species in having broader bracts enclosing more spikelets, shorter leaves, a hairy callus below the longer petiole, longer mucros of the flg. gls. and a long more acuminate palea. It is readily recognized by its yellow stems and reddish branchlets. The stems are leafing only, or flowering only, or both.

18. **A. Falconeri,** *Benth. in Gen. Plant.* iii. 1208: stem-sheaths oblong top narrowed truncate, leaves 3–6 by ½–¾ in. oblong-lanceolate soft thin petioled not tessellate but with a few pellucid glands, sheath glabrous with ciliate margins and a minute narrow ciliate callus below the petiole, ligule long hairy, bracts of large leafy panicles ovate-lanceolate, spikelets 1-fld., gl. I and II oblong acute or mucronate 3–5-nerved, fl. gl. ovate-lanceolate mucronate 5–7-nerved, palea as long or longer. *Gamble Bamb. Brit. Ind.* 20, t. 18; *Mitford, The Bamboo Garden*, 169. Thamnocalamus Falconeri, *Hook. f. ex Munro in Trans. Linn. Soc.* xxvi. (1868) 1834; *Brandis For. Fl.* 563. Bambusa floribunda, *Munro in Herb. Trin. Coll. Dublin.*— Bambusoides, *Wall. Cat.* n. 5040.

TEMPERATE HIMALAYA; from Kumaon to Bhotan, alt. 7–9000 ft., *Wallich*, &c.

Tall, shrubby. *Stem* ½–¾ in. diam., young smooth, old scurfy-white, often striped yellow and green; nodes raised, base of sheath persistent; internodes 8–15 in., walls ⅛ in. thick; branches many at the nodes with bracteate sheaths. *Stem-sheaths* 8–12 by 2–3 in.; ligule narrow, dark, hairy. *Leaves* smooth on both sides, ligule rounded hairy. *Rachis* of raceme flexuous, flattened. *Spikelets* with a terminal free rachilla, and a ring of hairs below the flg. gl.; keels of palea glabrous except at the tip, 1-nerved on each side.—The small sheaths enclosing short sinuous racemes, and the absence of transverse nervules in the leaves characterize this species.

Sect. IV. Climbing shrubs. *Stamens* 6 or fewer.

19. **A. Prainii,** *Gamble Bamb. Brit. Ind.* 21, t. 19; stem slender wiry, leaves 2–4 by ⅓–¾ in. not tessellate, sheath with a glabrous callus below the petiole, spikelets distant pedicelled on a wiry rachis, gl. I lanceolate keeled ciliate, II ovate acute 5-nerved, flg. gls. 3–6 on a flexuous clavate rachilla triangular acute 9–11-nerved. Microcalamus Prainii, *Gamble in Journ. As. Soc. Beng.* lix. ii. (1891) 207, t. 7.

ASSAM; on the Naga and Jaintea Hills, alt. 3500–7870 ft., *Prain*, &c.

Stem up to 30 ft. long, yellowish, ⅕–⅓ in. diam.; nodes swollen, solid or walls thick; branches fascicled. *Stem-sheaths* 2–6 by ⅓–¾ in., narrowed to a point in the upper half with an acicular blade. *Leaves* 2–4 in. thin, quite glabrous, base rounded petioled, tip curved setaceous; sheath smooth; ligule long, rounded. *Infl.* of axillary and terminal panicles of spikelets in the axils of sheathing bracts. *Spikelets* 1–1½ in., pedicels slender; empty gls. 2–3, nodes of rachilla clavate flattened; gl. I margins ciliate; II tip ciliate; fl. gls. falcate, strongly nerved; palea as long, falcate; keels minutely ciliate. *Stamens* 6.

B. Species of which the flowers are unknown.

* Stem-sheaths 2–8 in., imperfect blade generally recurved.

† Leaves tessellate with transverse nervules.

§ *Stems tufted on a short rootstock.*

20. **A. microphylla,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 32;

stems 2–4 ft., leaves ½–1 by $\frac{1}{10}$–$\frac{1}{5}$ in. linear-lanceolate acute mucronate tessellate, sheath hairy above tip long-fimbriate. *Gamble Bamb. Brit. Ind.* 22. Bambusa microphylla, *Griff. Journ.* i. 242, 259, &c.

BHOTAN, alt. 6–10,000 ft., *Griffith.*

A gregarious low shrub, forming large patches in wet places; internodes 2–3 in., glabrous; branches ½-whorled at the nodes. *Leaves* with almost membranous fimbriate or glabrous margins, nerves 2 pairs; sheath often dark; ligule obscure.—Descript. after Munro.

21. **A. hirsuta**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 30; stems 4–8 ft. solitary from the rhizome often strigosely hairy above, leaves 3–5 by ½–⅔ in. tessellate strigosely hairy beneath, sheath strigosely bristly ending in a hairy callus and reflexed spinescently bristly auricle. *Gamble Bamb. Brit. Ind.* 22, t. 20.

KHASIA and NAGA HILLS, alt. 5000–9500 ft., *Griffith*, &c.

Stems greyish-green, $\frac{1}{5}$–⅓ in. diam., nodes glabrous; internodes up to 13 in., walls rather thin. *Stem-sheaths* 6 in. by 1 in. broad at the base, top rounded with large recurved long-ciliate auricles; blade subulate, recurved; ligule narrow, pubescent. *Leaves* tessellate, smooth above, hairs white beneath, margins cartilaginous scabrous-serrate, midrib narrow shining, nerves 4–6 pairs; ligule long, hairy.—Resembles *A. Wightiana*, differing in the well marked auricles and bristles of both stem- and leaf-sheaths.

22. **A. Gallatlyi,** *Gamble Bamb. Brit. Ind.* 23, t. 21; stems thin, leaves 3–4 by ½–¾ in. tessellate whitish beneath base narrowed into a short petiole sheath ending in a narrow callus with about 3 long stiff bristles.

TENASSERIM; Moolyet Hill, alt. 6000 ft., *Gallatly.*

A gregarious shrub. *Branches* smooth, glabrous, striate, sometimes channelled. *Sheaths* of branchlets narrow, with imperfect blades and long ligules. *Leaves* pale green, tessellate, tips setaceous, scabrid, smooth above, one margin scabrid, nerves 3 pairs; ligule triangular, pubescent.

§§ *Stems distant on elongated rhizomes.*

23. **A. jaunsarensis,** *Gamble Bamb. Brit. Ind.* 23, t. 22; stems slender reed-like, leaves 4–6 by ½–¾ in. lanceolate acuminate tessellate base obliquely cuneate, sheath ending in falcate auricles with a few bristles.

WESTERN HIMALAYA; hills of Jaunsar in Garwhal, alt. 7–8000 ft., *Gamble.*

Rhizome long, creeping, clothed with shining imbricate ovate acute scales. *Stems* 2–3 ft. apart, 10–15 ft. high, ½ in. diam., young glaucous, old greenish-brown, internodes 9–11 in. *Stem-sheaths* 6–10 in. by 1½–2 in. broad at the base, narrowed to a truncate 2-auricled bristly tip; blade 1–3 in., subulate, recurved; ligule short, pubescent. *Leaves* thin, smooth above, scaberulous beneath, margins scabrous-serrate, tessellate, nerves 4–5 pairs; sheath with falcate auricles that bear 5–6 stiff bristles; ligule short, truncate, pubescent.—Nearest to *A. spathiflora*, distinguished by its rhizome, solitary green stems, auricled sheath, and thinner leaves.

24. **A. Rolloana,** *Gamble Bamb. Brit. Ind.* 24, t. 23; stems rather rough somewhat flattened on one side, lower nodes rooting, leaves 6–8 by 1–1½ in. oblong-lanceolate acute tessellate base rounded sparsely hairy beneath, sheath ending in a rounded long-ciliate auricle.

ASSAM; Naga Hills, alt. 5–7000 ft., *J. Rollo.*

Rhizome at first clothed with imbricating scales, afterwards jointed, joints about ½ in. long. *Stems* 8 ft. by $\frac{1}{5}$–½ in. diam., green then yellow, lower nodes rooting;

internodes 10–12 in., walls thin. *Stem-sheaths* 4–6 by 1 2 in., covered with at length deciduous bristles, shining, margins ciliate, auricles falcate and with long bristles, blade subulate recurved. *Leaves* glabrous above, tessellate, margins cartilaginous spinulose-scabrous, nerves 8–10 pairs; petiole broad, flat; ligule long, membranous, deeply cleft. Remarkable for its broad leaves.

25. **A. armata,** *Gamble Bamb. Brit. Ind.* 130, t. 119; rootstock creeping, stems solitary, nodes smooth slightly thickened, leaves oblong-lanceolate long-acuminate tessellate smooth above slightly rough beneath, margins scabrid, midrib pubescent above.

Hills of UPPER BURMA, alt. 5500 ft., *Oliver.*

Evergreen. *Stems* about 20 ft. by 1–1¾ in. diam., green, straight, smooth, walls very thin; nodes with a belt of straight smooth spines, internodes about 8 in.; stem-sheaths 6–8 in. by 2½–3 in. broad at the base, thin, tapering to a very narrow tip, smooth or with scattered hairs above the middle, margins ciliate; blade about $\frac{1}{10}$ in., triangular, pubescent; ligule very narrow, ciliate. *Leaves* 6–9 by ¾–1¼ in., bright green, base narrowed, petiole $\frac{1}{10}$–$\frac{1}{5}$ in., tip twisted scabrid, midrib narrow pale shining, nerves 6 pairs with 5–7 intermediate, transverse nervules very many irregularly spaced; leaf-sheaths striate, ending in small calli and bearing 10 12 stiff bristles; ligule very short, ciliate. *Inflorescence* unknown.—Near *A. callosa*, Munro, but quite distinct.

†† Leaves not or inconspicuously tessellate by transverse nervules.

26. **A. suberecta,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 32; stems cæspitose wiry erect, leaves narrow 2–4 by $\frac{1}{5}$–$\frac{1}{3}$ in. subsessile linear not or hardly tessellate, base narrowed margins revolute, sheath ending in a callus with a few deciduous bristles. *Gamble Bamb. Brit. Ind.* 25, t. 24.

SIKKIM HIMALAYA, *Kennedy.* KHASIA and JAINTEA HILLS, alt. 4000–5000 ft. *Griffith*, &c.

Stems 10–15 ft. by ⅓ in. diam., olive-green, smooth; nodes slightly swollen; internodes 6–10 in., walls thick; branchlets short, whorled. *Stem-sheaths* 2–6 by ½ in. broad at base, glabrous, gradually narrowed to a naked or fimbriate mouth; blade ½–1½ in., subulate, recurved; ligule long, tip fimbriate. *Leaves* pale beneath, with many pellucid glands, tip setaceous, margins scabrous-serrate, nerves 3–4-pair; ligule rather long, pubescent.

27. **A. Kurzii,** *Gamble Bamb. Brit. Ind.* 25, t. 25; nodes with a thick ring bearing very many long wiry geniculate branches, leaves 2–4 by $\frac{1}{5}$–$\frac{1}{3}$ in. subsessile very thin linear-lanceolate acute obscurely tessellate, base unequally narrowed, sheath slender striate, ending in a small callus and a few thin cilia.

SOUTHERN BURMA; on the coast, *Kurz.*

Apparently a bushy shrub. *Stem* smooth, ⅓–½ in. diam. *Leaves* acute with a short point, smooth on both surfaces with a few long tubercle-based hairs on the nerves beneath, costa thin pale, nerves 2 pairs, transverse nervules very few and inconspicuous; ligule short sometimes ciliate.—Remarkable for its thin leaves and geniculate pale branchlets.

** Stem-sheaths 12–18 in. long, blade long.

28. **A. Mannii,** *Gamble Bamb. Brit. Ind.* 26, t. 26; stem tufted climbing wiry solid, blade of stem-sheath 6–10 in. linear, leaves 6–9 by ¾–1 in. petioled lanceolate hirsute beneath not tessellate.

ASSAM; Jaintea Hills, alt. about 3000 ft., *Mann.*

Stems 30 ft., much branched, nodes thickened, branches many geniculate; internodes 3 ft., smooth. *Stem-sheaths* 12–18 in., convolute, slender; rough with

appressed bristles; ligule narrow, toothed. *Leaves* papery, base narrowed or rounded, tip thickened hirsute surmounted by a capillary bristle; sheath ending on one side in a round shining exauricled callus, on the other in a short pointed auricle with a few bristles; petiole wrinkled; ligule small, hairy, ciliate.—A curious species resembling *A. Prainii*, remarkable by its long narrow sheaths; its leaves resemble those of *Cephalostachyum*.

133. **PHYLLOSTACHYS,** *Sieb. & Zucc.*

Cæspitose shrubs. *Stems* smooth, flattened on one side, branches fascicled at the nodes. *Stem-sheaths* rounded above, blade subulate. *Leaves* jointed on the sheath, spinulose on one margin, tessellate, sheath loose. *Infl.* of spicate branchlets in a leafy terminal panicle with imbricating bracts. *Spikelets* 2–3, 1–4-fld. with a terminal imperfect rachilla jointed between the fls.; empty gls. 2–3, many-nerved, often bearing an imperfect blade; flg. gls. ovate-lanceolate, acuminate, many-nerved; palea 2-keeled, many-nerved. *Lodicules* 2. *Stamens* 3. *Ovary* stipitate, rounded, glabrous, style long, stigmas 3.—Species about 20, Eastern Asiatic.

1. **P. bambusoides,** *Sieb. & Zucc. in Abh. Akad. Münch.* iii. (1843) 745, t. 5, f. 3; leaves thin, mouth of sheaths with long bristles. *Steud. Syn. Gram.* 339; *Munro in Trans. Linn. Soc.* xxvi. (1868) 36; *Franch. & Sav. Enum. Pl. Jap.* ii. 182; *Gamble Bamb. Brit. Ind.* 27, t. 27; *Mitford, The Bamb. Gard.* 155. P. megastachya, *Steud. l. c.* Bambusa reticulata, *Rupr. Bamb.* 58. B. bifolia, *Sieb. mss. ex Munro.*

Upper Assam; Mishmi Hills (without flowers), *Griffith.*—Distrib. China, Japan.

Stems 10–12 ft., ½–⅔ in. diam., graceful, smooth, yellow, nodes glabrous, internodes short, branches semiverticillate. *Stem-sheaths* 6–10 in., thin, top contracted into a short neck then rounded and truncate, margins produced to meet the ligule with a few bristles; blade subulate; ligule long, toothed. *Leaves* 3–4 by ½–⅔ in., oblong-lanceolate, tip setaceous, glaucous and with stiff white hairs beneath, nerves 5–6-pairs; petiole black, hairy; sheath keeled, ciliate on one margin, mouth with bristles on a short auricle; ligule rounded. *Bracts of infl.* short, obtuse, sheathing 3–5 spikelets and with an imperfect blade. *Spikelets* 1–1⅕ in.; gl. I very large, sheath-like, truncate, with a green cordate blade; II oblique, keeled, few-nerved, keels ciliate; flg. gls. ¾ in., ovate, acuminate, many-nerved; palea as long.—Description from Hongkong specimens.

2. **P. Mannii,** *Gamble Bamb. Brit. Ind.* 28, t. 28; leaves thick, mouth of sheath nearly naked.

Khasia Hills, alt. 5000 ft., cult. (said to have come from the Naga Hills), *Mann.*

Stems 15–20 ft. by 1–1¼ in. diam.; internodes 8 in., yellow. *Stem-sheaths* papery, 8–9 by 1–2 in., top rounded and truncate; blade 2–3 in., subulate; ligule broad, pectinate. *Leaves* 4–5 by ½–¾ in., base rounded, tip shortly acuminate, glabrous or nearly so, one margin spinulose-serrate, costa prominent, nerves 5 pairs; sheath loose, ending in a narrow ciliate callus with a few bristles; ligule broad, long-pectinate. *Infl.* unknown.

134. **BAMBUSA,** *Schreb.*

Shrubs or trees, usually large and cæspitose, rarely climbing; stem-sheaths broad, blade often triangular. *Leaves* shortly petioled not tessellate by nervules, but sometimes by pellucid glands, sheaths variously

auricled. *Infl.* generally a large leafless panicle bearing heads on spiciform branches, or of leafy panicles, or panicled spikes. *Spikelets* 1– many-fld.; lower gls. 1–4, empty or gemmiferous; fl. gls. ovate-lanceolate, uppermost imperfect; palea 2-keeled. *Lodicules* 2–3, membranous, ciliate, rarely 0. *Stamens* 6. *Ovary* oblong or obovate, tip hairy; style long or short, stigmas 2–3. *Grain* oblong or linear-oblong, furrowed on one side; pericarp thin, adherent.—Species about 50, Eastern Asiatic, Malayan, and one Australian.

In enumerating the nerves of the leaves the principal ones on each side of the midrib alone are given.

A. Species of which the flowers are known.

Sect. I. Arborescent (except *B. nana* and *affinis*). *Stem* not spinous. *Spikelets* cylindric, except *B. Balcooa*. *Lodicules* 3.

* Spikelets in loose heads.

† Stem-sheaths with a triangular reniform or cordate blade, auricles large.

§ *Keels of palea more or less ciliate or toothed.*

1. **B. Tulda,** *Roxb. Fl. Ind.* ii. 193; leaves linear-oblong or -lanceolate, spikelets 1–3 in. in interrupted clusters mixed with chaffy bracts usually 1–2 bracteolate 4–6-fld., lowest 3–4 gls. acute many-nerved usually gemmiparous, flg. gls. ½–1 in. ovate acute acuminate or mucronate, palea shorter cymbiform, anthers obtuse glabrous purple, ovary obovate-oblong. *Munro in Trans. Linn. Soc.* xxvi. (1868) 91; *Brand. For. Flor.* 566; *Kurz For. Fl. Burm.* ii. 552; *Gamble Bamb. Brit. Ind.* 30, t. 29. B. Macala, *Ham. ex Wall. Cat.* n. 5026 A. B. trigyna, *Roxb. mss. in Herb. Mus. Brit.* Dendrocalamus Tulda, *Voigt Hort. Suburb. Calcutt.* 718.—Bambusa, *Wall. Cat.* n. 5026 A, 5027, 5030 B, C.

Bengal, Assam, the Northern Circars, and Burma, wild and cult.

Gregarious. *Stems* 20–70 ft., 2–4 in. diam.; nodes not swollen; internodes 1–2 ft., white-ringed below the nodes, walls ⅓–½ in. thick. *Stem-sheaths* 6–9 by 6–10 in. broad below, narrowed upwards, tip rounded or subtriangular, glabrous hairy or white-powdered; blade hairy within, auricles long-fringed. *Leaves* 6–10 by ¾–1½ in., base usually rounded, tip subulate twisted, beneath glaucescent and puberulous, pellucid glands faint, nerves 6–10 pairs; petiole often hairy; sheath glabrous, ending in a smooth callus and oblong long-fringed auricle; ligule narrow, obscure. *Infl.* variable, from an immense radical leafless panicle to a short leafy panicle or spiciform branch; rachilla clavate, flattened, fragile; palea 5–7-nerved between the keels, tip penicillate. *Lodicules* 3.—Flowers gregariously and in single clumps.

2. **B. nutans,** *Wall. Cat.* n. 5031; stems solitary from a creeping rhizome, leaves linear-lanceolate tessellate with pellucid glands, ligule long obtuse hairy, spikelets in bracteate fascicles many empty or gemmiparous, fertile few ¾–1 in., 2–3 lowest gls. neuter 5–7 fertile all ovate acute mucronate many-nerved puberulous within, palea shorter ovate flattened keels overlapping long ciliate, anther-tips long apiculate or slightly penicillate, ovary subovoid. *Munro in Trans. Linn. Soc.* xxvi. (1868) 92; *Brand. For. Flor.* 567; *Gamble Bamb. Brit. Ind.* 32, t. 30. B. crinita, *Thoms. ex Munro l. c.* 157. Bambusa Falconeri, *Munro l. c.* 95 in part.—Bambusa, *Wall. Cat.* n. 5030 A.

Lower Himalaya; from the Jumna to Assam and Eastern Bengal, ascending to 5000 ft. in Sikkim.

Stems 20–40 ft. by $1\frac{1}{2}$–3 in. diam., graceful, naked below, straight, nodes not much raised often hairy, lower rooting; internodes 15–18 in., not shining, white-ringed below the nodes, thick-walled. *Stem-sheaths* 6–9 in., top roundly truncate, dorsally clothed with black hairs, base with a ring of soft deciduous hairs; blade of lower nodes and uppermost shoots 6–9 in., of middle nodes shorter, acute, black-hairy within, margins recurved, base rounded decurrent on the top of the sheath with large waved densely bristly auricles, bristles long curved. *Leaves* 6–12 by 1–$1\frac{1}{2}$ in., white beneath when dry, tip twisted scabrid, midrib and margins scabrid, nerves 7–10; sheath ending in a smooth callus and falcate auricle with long bristles. *Infl.* a stiff panicle with spiciform branches. *Lodicules* 3, long-fimbriate.—Difficult to distinguish from *B. Tulda* without flowers, except by the rhizome. *B. Falconeri*, Munro, was founded on flower of *B. nutans* and leaves of *Dendrocalamus Hamiltoni*.

3. **B. teres,** *Ham. ex Wall. Cat.* n. 5026 B; stems cæspitose, leaves large oblong-lanceolate tesselate by pellucid glands, spikelets 1–2 in. in bracteate heads neuter and fertile, 1–2 lowest gls. empty or gemmiparous ovate acute mucronate, flg. gls. 5–6 ovate-lanceolate from a broad base acute many-nerved tip sometimes foliaceous, palea ovate acute scaberulous 5–6-nerved between the toothed keels, anthers narrow tips penicillate. *Munro in Trans. Linn. Soc.* xxvi. (1868) 95; *Gamble Bamb. Brit. Ind.* 33, t. 31.

Eastern Bengal; Gongachora, *Hamilton.* Assam, *Jenkins.*

Stems 60 ft. by 3 in. diam., nodes ringed by the bases of fallen sheaths; internodes 20 in., walls $\frac{3}{10}$–$\frac{4}{10}$ in. thick. *Stem-sheaths* 8–10 in. long and broad, hardly narrowed upwards, top rounded, nearly glabrous; blade 4–6 in., triangular, cuspidate, base rounded and decurrent in broad wavy fringed auricles, appressed-hairy beneath; ligule narrow, white-hairy. *Leaves* 12–14 by $1\frac{1}{2}$–$1\frac{3}{4}$ in., tip long-acuminate twisted scabrid, base unequally narrowed shortly pubescent beneath, nerves 10–16, pellucid glands many; sheath ending in a broad shining callus; ligule short. *Infl.* a large compound panicle with spiciform branches bearing fascicles of spikelets and chaffy bracts. *Lodicules* sub-obovate, fimbriate, many-nerved.

4. **B. Ridleyi,** *Gamble Bamb. Brit. Ind.* 34, t. 32; leaves 12–14 by $1\frac{1}{2}$–2 in. margins smooth, sheath exauricled, ligule deeply 2-lobed, spikelets 1–2 in. few in distant clusters 3–5-fld. many neuter, empty gls. 2–4 ovate acuminate, fl. gls. ovate-lanceolate mucronate many-nerved, palea shorter oblong keels minutely ciliate near the 2-fid tip, anthers long narrow setosely apiculate.

Singapore, at Bukit Timah, *Ridley.*

Leaves oblong-lanceolate, tip subulate scabrid with its margins recurved, scaberulous above, smooth beneath, nerves 10–12 pair, petiole broad; sheath appressed hairy, subcarinate, ending in a narrow callus, margins truncate at the ligule which has long stiffy ciliate lobes. *Infl.* on long spiciform leafy branches bearing very distant clusters of few spikelets. *Rachilla* short. *Palea* many-nerved between the keels. *Lodicules* 3, many-nerved, long-fimbriate.—Habit and stem-sheaths unknown.

5. **B. burmanica,** *Gamble Bamb. Brit. Ind.* 35, t. 33; leaves of young plants 10–12 by $\frac{1}{2}$–2 in. white-hairy on both surfaces of older smaller smooth above hairy beneath, ligule short, spikelets 1 in. or less in spiciform branches of a panicle each in the axil of a long narrow truncate bract, empty gls. 2 mucronate, flg. gls. 5–6 ovate acute many-nerved, palea elliptic-ovate keels ciliate, anthers narrow tips apiculate.

UPPER BURMA; Katha district, *Oliver*.

Stems 50–60 ft., 4 in. diam., dull green, nearly solid, internodes 12 in. with a ring of white hairs below the not much swollen nodes. *Stem-sheaths* green with yellow margins, rather broader than long, top rounded, sides with appressed golden hairs; blade broadly cordate, cuspidate, base dilated into large rounded fringed auricles; ligule short. *Leaves* oblong-lanceolate, base unequally narrowed or rounded, tip with a twisted scabrous point, pellucid glands many, nerves 5–8 pair; sheath reddish-brown, keeled, tip truncate with a small deciduous auricle and deciduous cilia; ligule short, denticulate. *Infl.* a panicle of spiciform branches; rachis wiry. *Palea* with overlapping margins and 4–5 nerves between the keels; rachilla short, thick. *Lodicules* 3, 5–6-nerved, ciliate. *Ovary* stipitate. *Grain* oblong, top hairy.—A large handsome species.

§§ *Keels of palea eciliate.*

6. **B. polymorpha,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 98; leaves small linear at first hairy on both surfaces, ligule very short, spikelets about $\frac{1}{2}$ in. few together in many bracteate fascicles born on the long spiciform branches of a large panicle, shining, each in the axil of a long bract, empty gls. 1–3 ovate acuminate, flg. 2–3 ovate mucronate many-nerved, palea rather longer lanceolate, anthers obtuse or apiculate. *Kurz For. Fl. Brit. Burm.* ii. 553; *Gamble Bamb. Brit. Ind.* 36, t. 34. Bambusa cyanostachya, *Kurz MS. in Herb. Kew.*

EASTERN BENGAL, PEGU & MARTABAN, *Brandis*, &c.

Evergreen, tufted, sometimes deciduous; stems attaining 50–80 ft. by 3–6 in. diam., curving outward, young white-scurfy, nodes thickened; internodes 15–24 in. *Stem-sheaths* 6–7 in. by 12–14 broad, thick, dorsally densely white-pubescent, narrowed upwards and curved; blade reniform, 3 in. long, plaited and long ciliate below, base rounded and dilating into a broad band lining the top of the sheath, auricles falcate, the whole fringed with bristles; ligule narrow, entire. *Leaves* 3–7 by $\frac{1}{6}$–$\frac{1}{2}$ in., base rounded or narrowed, nerves 4–6 pairs; sheath compressed, hairy, ending in a callus and minute auricle with deciduous bristles. *Spikelets* often brownish, subpedicelled, enclosed in a long curved glabrous bract. *Lodicules* 3, suborbicular. *Anthers* purple. *Grain* $\frac{1}{3}$ in., ovate, plano-convex, top hairy.

†† Stem-sheaths with a very long or narrow or imperfect blade, auricles 0 or minute; keels of palea ciliate.

7. **B. pallida,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 97; cæspitose, blade of stem-sheaths very long auricles small, leaves linear-lanceolate glabrous above often white-hirsute beneath, spikelets 1–1$\frac{1}{3}$ in. fertile and neuter on the spiciform branches of a large panicle, 1 or 2 lowest gls. ovate acute empty, then one male or gemmiparous followed by 3–8 flg. and 3–5 imperfect, flg. gls. ovate acute many-nerved, palea much shorter acute, anther-tip 1–2-setose or naked, ovary narrowed into the hairy style. *Gamble Bamb. Brit. Ind.* 37, t. 35. B. critica, *Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 250. Dendrocalamus criticus, *Kurz For. Flor. Brit. Burm.* ii. 559.

SIKKIM HIMALAYA, N. & E. BENGAL, the KHASIA HILLS, ASSAM, UPPER BURMA & PEGU, alt. 5–6000 ft. (cult. in the plains below).

Stems graceful, 40–60 ft. by 2–3 in. diam., olive green; nodes not prominent; internodes 18–30 in., walls thin. *Stem-sheaths* 7–12 by about 10 in. broad, top straightly truncate, young more rounded, glabrous or hairy; blade up to 14 in., triangular, acuminate, sparsely hairy, margins and very small auricles bristly; ligule very narrow. *Leaves* 4–8 by $\frac{1}{2}$–$\frac{2}{3}$ in., tip subulate scabrid twisted, nerves 4–6;

sheath glabrous, ending in a smooth callus and a rounded erect fringed auricle; ligule very short. *Panicle* very large, pale. *Spikelets* pale, sometimes curved; rachilla short, clavate; palea 3–5-nerved between the keels. *Lodicules* 3. *Stigmas* 3. —Very like *B. Tulda*, but distinguished by the stem-sheaths, smaller narrow leaves, and ovary.

8. **B. affinis**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 93; shrubby, blade of stem-sheaths small lanceolate, leaves lanceolate or oblong-lanceolate scabrid beneath tessellate by pellucid glands, sheath setose keeled, ligule broad, spikelets about 1 in. in small distant whorls on terminal leafy spikes or panicles 6–10-fld. coriaceous shining, flg. gls. acuminate very-many-nerved folded at the base, palea much narrower, ovary sub-obovoid. *Kurz For. Fl. Brit. Burm.* ii. 551; *Gamble Bamb. Brit. Ind.* 39, t. 36.

Forests of MARTABAN & BURMA E. of the Sittang river, *Kurz*, *Brandis*.

Stems 15–20 ft. by 1–1½ in. diam., pale green or striped with white, appressed-pubescent; internodes 1–2 in., tubular, with black hairs below the slightly thickened nodes. *Stem-sheaths* 4–6 in. long and broad, green, later straw-colrd., glabrous or with patches of appressed hairs, top rounded; blade 1–2 in., longer in young shoots, usually recurved, appressed hairy within, base decurrent as a narrow terminal wing of the sheath; ligule narrow. *Leaves* 6–10 by 1–1½, petiole rather long, points twisted scabrid, nerves 8–10; sheath ending in a short callus. *Spikelets* in small whorls; rachilla short, top bearded; palea 7-nerved between the keels, 4-nerved beyond them. *Lodicules* 3, many-nerved. *Stigmas* 3.

9. **B. khasiana**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 97; stem solitary from a creeping rootstock, blade of stem-sheaths with large inflated wings above the contracted base, leaves lanceolate or oblong-lanceolate and sheaths glabrous, spikelets sterile (short) and flg. (long) $\frac{6}{10}$–$\frac{8}{10}$ in. in distant heads on the spiciform branches of a long panicle 1–4 lowest gls. empty or gemmiparous ovate mucronate strongly nerved, flg. gls. 2–3-fld 11–13-nerved, tip hairy within, palea as long as the gl. or longer many-nerved, anthers obtuse, ovary narrowed into the style. *Gamble Bamb. Brit. Ind.* 39, t. 37.

KHASIA to the MUNNEPORE HILLS, alt. 1–4000 ft., *J. D. H. & T. T.*, &c.

Stems 30–40 ft. by 1–1½ in. diam., graceful, fistular, rather soft, dull olive green, young golden hairy; internodes 5–15 in. with a whitish ring below the not prominent nodes and bluish ring above them; walls $\frac{1}{10}$–$\frac{3}{10}$ in. *Stem-sheaths* 5–6 by 4–5 in., tawnily hairy, straight top truncate; blade as long as the sheath or longer, cuspidately acuminate, auricles 0; ligule narrow. *Leaves* 4–9 by 1–1½ in., pale, tip setaceous shaggy, nerves 6–8 obscure; sheath ending in a broad callus and minute setose auricle; ligule elongate, truncate. *Spikelets* cylindric, at length flattened. *Branches* of *panicle* fistular. *Lodicules* short, broad, fimbriate. *Stigmas* 3.

9*. B. NANA, *Roxb. Fl. Ind.* ii. 190; dwarf, shrubby, blade of stem-sheaths linear, leaves small linear-lanceolate, spikelets ½–1½ in. few clustered or solitary on the branches of short diffuse panicles, gls. 5 or more all flg. rarely the lowest empty ovate acute many-nerved, palea shorter than the gl. keels minutely ciliate at or near the tip only, anthers obtuse or sub-apiculate yellow, ovary obovoid. *Wall. Cat.* n. 5036; *Munro in Trans. Linn. Soc.* xxvi. (1868) 89; *Kurz For. Fl. Burma*, ii. 551; *Ind. Forester*, i. 339; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 41, t. 38. B. caesia, *Sieb. & Zucc. fid. Munro.* B. glauca, *Lodd. Cat.*; *Lindl. in Penny Cycl.* iii.

(1835) 357. B. glaucescens, *Sieb. Cat. fid. Munro.* B. sterilis, *Kurz in Miq. Ann. Bot. Lugd. Bat.* ii. 285. B. viridi-glaucescens, *Carr. in Rev. Hortic.* 1869, 292. Arundinaria glaucescens, *Beauv. Agrost.* 144; *Nees Agrost. Bras.* 526; *Kunth Enum. Pl.* i. 426; *Rupr. Bamb.* 23, t. i. p. 3; *Steud. Syn. Gram.* 334; *Miq. Fl. Ind. Bat.* iii. 413; *Munro l. c.* 22. Ischurochloa floribunda, *Büse in Miq. Pl. Jungh.* 390; *Fl. Ind. Bat.* iii. 422. Ludolfia glaucescens, *Willd. in Ges. Naturf. Fr. Berl. Mag.* ii. (1808) 320. Panicum arborescens, *Lamk. Encycl.* iv. 749. Triglossum arundinaceum, *Fisch. ex Roem. & Sch. Syst. Veg.* 846.

MALAYAN PENINSULA; Pahang, alt. 7000 ft., *Wray* (wild?). Cultivated in Ceylon (CP. n. 4022) and in many parts of India.—Native of China and Japan.

Stems 6–10 ft., ½–1 in. diam., densely tufted, hard, green then yellow, branched from the base; nodes thickened; internodes 8–15 in. *Stem-sheaths* 4–6 by 2–3 in. broad, stiff, glabrous, narrowed upwards, top rounded; blade 2–3 in., acuminate, decurrent on the sheath, ciliate, appressed-hairy or glabrous above; ligule narrow, entire. *Leaves* 2–4 by ½ in., distichous, tip subulate twisted, not tessellate, costa faint, nerves 3–6; sheath ending in a prominent callus, auricle fringed; ligule short. *Spikelets* straw-colrd.; rachilla flattened, glabrous; palea many-nerved. *Lodicules* linear. *Style* very short. *Grain* elliptic, furrowed, shortly beaked, top hairy.

** Spikelets ovate-lanceolate in dense heads, flattened.

10. **B. Balcooa,** *Roxb. Fl. Ind.* ii. 196; stem-sheaths dimorphic, leaves oblong-lanceolate base rounded, sheath hairy, heads of spikelets bracteate, spikelets ⅓–½ in. or more, empty gls. 0–2 ovate acute many-nerved, flg. gls. 4–6 larger margins ciliate, palea as long as the gl. ovate acute keels long-ciliate, anthers glabrous connective produced, ovary broadly ovoid. *Munro in Trans. Linn. Soc.* xxvi. (1868) 100; *Brandis For. Fl. Brit. Burm.* 567; *Gamble Bamb. Brit. Ind.* 42, t. 39. B. capensis, *Rupr. Bamb.* 54, t. 13, f. 54; *Steud. Syn. Gram.* 330. B. Vasaria, *Ham. ex Wall. Cat.* n. 5025. Dendrocalamus Balcooa, *Voigt Hort. Suburb. Calcutt.* 718.

BENGAL, from the Gogra, eastwd. to BEHAR and ASSAM.

Stems 50–70 ft., 3–6 in. diam., cæspitose, branched from the base, lower branches stiff leafless; internodes 8–18 in. with a whitish ring below and a hairy one above the swollen nodes, walls thick. *Stem-sheaths* of two forms; lower short, broad, ciliate, top rounded; blade short triangular decurrent into short fringed auricles; upper 10–14 by 8–10 in., almost glabrous, ciliate, truncate, blade 6–8 by 3–4 in., closely hairy above, margins recurved, base rounded and decurrent as a narrow band; ligule broad toothed. *Leaves* 6–12 by 1–2 in., pellucidly tessellate with glands, tip twisted scabrid, margins scabrous-ciliate, nerves 7–11; sheath appressed, hairy, truncate above with a narrow callus, bristly or not; ligule broadly triangular, membranous. *Panicle* compound, rachis pubescent or scurfy, swollen above; palea obscurely nerved. *Lodicules* 3, ovate or obovate, fimbriate. *Anthers* glabrous, pointed. *Stigmas* 3, long.

Sect. II. Arborescent or shrubby. *Stems* not spinous. *Spikelets* flattened; flg. gls. few or many. *Lodicules* 2–3.

10*. B. VULGARIS, *Schrad. in Wendl. Collect.* ii. 26, t. 47; nodes with a hairy ring, leaves linear-lanceolate petioled glabrous tessellate by pellucid glands, sheath laxly hairy, callus smooth, auricle ciliate, ligule short, spikelets $\frac{6}{10}$–$\frac{8}{10}$ in. in bracteate clusters of 3–10 oblong acute bifid, empty gls. 1–2 ovate acute many-nerved tip ciliate, flg. gls. 6–10 larger, palea as long as the gl. keels white-ciliate, anthers obtuse hairy apiculate purple, ovary narrow hairy, style long. *Roth Nov. Sp.* 198 (*excl. Syn.*

R. & S.); *Ruprecht in Mem. Acad. Petersb. Ser.* VI. v. (1839) 140, *Bamb.* 47, t. 11, f. 47; *Steud. Syn. Gram.* 329; *Dalz. & Gibs. Bomb. Fl.* 299; *Munro in Trans. Linn. Soc.* xxvi. (1868) 106; *Beddome Fl. Sylv., Forest. Man.* p. ccxxxii.; *Brandis For. Flor.* 568; *Kurz For. Fl. Brit. Burm.* ii. 551, *Ind. Forester*, i. 339; *Miq. Fl. Ind. Bat.* iii 417; *Griseb. Fl. Brit. W. Ind.* 528; *Rivière, Les Bambous*, 191, f. 18, 19; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 44, t. 40. B. arundinacea, *Ait. Hort. Kew Ed.* II. 316; *Moon Cat. Ceyl. Pl.* 26 (*non Willd.*). B. humilis, *Reichb. fil. Rupr. l. c.* 50. B. Sieberi, *Griseb. l. c.* 5. B. striata, *Lodd. ex Munro l. c.* 121; *Bot. Mag.* t. 6079. B. surinamensis, *Rupr. l. c.* 49, t. 11, f. 49; *Steud. l. c.* 329. B. Thouarsii, *Kunth in Journ. de Phys.* (1822) 148; *Rev. Gram.* i. 323, t. 73, 74, *Enum. Pl.* i. 431, *Suppl.* 356; *Rupr. Bamb.* 48, t. 11, f. 48; *Steud. l. c.* 329; *Nees in Linnæa*, 466; *Thwaites Enum. Pl. Ceyl.* 375. Nastus Thouarsii, *Spreng. Syst.* ii. 113.

Cultivated throughout tropical INDIA and in all hot countries. (Wild in Java, *Kurz*).

Stems 20–50 ft., by 2–4 in. diam., rather distant, green yellow or striped, polished; nodes hardly raised, with usually a ring of brown hairs; internodes 10–18 in., walls rather thin. *Stem-sheaths* 6–10 in. by 7–9 in. broad, often streaked with yellow, thickly hairy above, top rounded retuse; blade 2–6 by 4 in., appressed hairy on both surfaces, base rounded decurrent with rounded falcate fimbriate auricles; ligule broad, toothed or fimbriate. *Leaves* 6–10 by $\frac{2}{3}$–$1\frac{2}{3}$ in., pale, petioled, tip twisted scabrid, nerves 6–8; sheath loosely hairy, callus ciliate, auricle rounded; ligule short, ciliate. *Panicle* large, leafy, clusters of spikelets largest at the nodes, rachis scurfy. *Lodicules* 3, winged, ciliate.

11. **B. Oliveriana**, *Gamble Bamb. Brit. Ind.* 130, t. 116; stems cæspitose, leaves small linear thin, auricles unequal, panicle of drooping unilateral spikes with distant bracteate clusters of 1–3 flattened spikelets about $\frac{1}{2}$ in. long, empty gls. 1–2 ovate-lanceolate, flg. gls. 3–4 9-nerved, rachilla long flattened, palea as long as the gl. acute tip penicillate keels glabrous, anthers obtuse, ovary elongate ovoid, style short, stigmas 2.

UPPER BURMA, *Oliver, Rogers.*

Stems graceful, 40–45 ft., 1–2 in. diam.; glossy green, branching from the base, internodes about 14 in. *Stem-sheaths* thin, pale, 8–10 in. by 4–5 broad, narrowed upwards to a mouth 2–3 in. broad, glabrous; blade 4–8 in., triangular-lanceolate, cordate, sparsely hairy on both surfaces; auricles unequal long fringed, one $\frac{1}{10}$–$\frac{1}{3}$ in. rounded, the other decurrent; ligule $\frac{1}{10}$ in. broad, serrate. *Leaves* 4–7 by $\frac{1}{3}$–$\frac{2}{3}$ in., petioled, glabrous, nerves 4–5 pair; sheath glabrous, callus emarginate; ligule rather long. *Bracts* of infl. truncate, glabrous. *Palea* 3-nerved between and on either side of the keels. *Lodicules* 3, rounded, fimbriate. *Grain* ovoid. *Anthers* striped red and yellow, then purple.

12. **B. Binghami**, *Gamble Bamb. Brit. Ind.* 45, t. 41; stems wiry, leaves linear or linear-lanceolate base rounded tip long twisted glabrous, panicle terminal short leafy, spikelets few in scattered fascicles about $\frac{1}{2}$ in. long, empty gls. 1–2 striate mucronate, flg. gls. 5–6 ovate acute mucronate smooth many-nerved, palea as long as the gl. or longer keels fringed with long hairs, anthers obtuse or with an apical hair, ovary elongate, style short.

LOWER BURMA; Tenasserim, *Bingham.*

Leaves 3–6 by $\frac{1}{3}$–$\frac{2}{3}$ in., subsessile or petiole very short, smooth on both surfaces, nerves 5–6 pairs. *Panicle* with short rachis; joints sometimes geniculate clavate. *Spikelets* with distichous gls., rachilla evident broad clavate flexuous; palea conspicuous. *Lodicules* rounded, long-ciliate. *Grain* linear-oblong, beak hairy.—Appears not to differ very greatly from the Chinese *B. flexuosa*, Munro.

13. **B. Kingiana,** *Gamble Bamb. Brit. Ind.* 46, t. 42; leaves linear-lanceolate tessellate by pellucid glands base unequally rounded, petiole flat, sheath smooth, ligule broad toothed or fimbriate, spikelets ½ in. few in regularly spaced clusters ovate flattened, empty gls. 2 ovate acute margins ciliate, fl. gls. 4–6 similar but larger, palea oblong keels long-ciliate, anthers penicillate, ovary stipitate broadly ovoid, style short stout.

Upper Burma; Katha district, *Oliver*.

Stems 60–70 ft., up to 4 in. diam. *Leaves* 10–12 by 1–2½ in., tip scabrid, at first sparsely hairy beneath, nerves 10–15 pairs; petiole ⅕–⅓ in.; sheath smooth, margins ciliate, callus broad shining, auricle small naked; ligule unequal-sided. *Panicle* large, compound, rachis of spiciform branchlets flexuous, joints flattened on one side, bracts small. *Spikelets* purplish, rachilla clavate flattened. *Lodicules* 3, long-fimbriate. *Stigmas* 3.—Habit of a *Dendrocalamus*. *Stem-sheaths* not known.

Sect. III. Shrubby, not spinous. *Spikelets* ovate, flattened, many-fld., long-mucronate. *Lodicules* 0.

14. **B. lineata,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 118; stems reed-like, leaves large stiff brittle ovate- to linear-lanceolate, ligule short stiffly fimbriate, infl. of spikes or panicles terminating leafy branchlets and bearing bracteate clusters of often spirally twisted spikelets about ½ in., bracts large, empty gls. 1–2 ovate long acuminate 5–7-nerved, flg. longer white-ciliate, palea narrow keels minutely ciliate, anther-tips penicillate, ovary oblong pubescent. *Gamble Bamb. Brit. Ind.* 46, t. 43. B. Rumphiana, *Kurz in Journ. As. Soc. Beng.* xxxix. (1870) 86, *Ind. Forester*, i. 341. B. Amahussana. B. atra, B. picta, B. prava, *Lindl. in Penny Cyclop.* iii. (1835) 357. Leleba Rumphiana, *Kurz in Cat. Hort. Bogor.* (1866) 20. L. lineata, *Rumph. Herb. Amb.* vi. 5, t. 1.

Andaman Islds., *Prain*, in marshy coast forests.—Distrib. Malay Archipelago.

Stems short, always flowering, ½–1 in. diam., green or striped with yellow, young much branched, sparsely bristly; nodes ringed by the bases of the fallen sheaths; internodes 16–24 in., rough. *Stem-sheaths* about 6 by 3–4 in., truncate, young strigose with golden hairs; blade usually as long as the sheath, ovate, cuspidate, erect, many-nerved, base rounded then dilating into a hairy long ciliate band on the sheath. *Leaves* very variable, up to 15 by 3 in. on the shoots, shorter on the branches, dull green, pale beneath, tessellate by pellucid glands, tips and margins scabrid, nerves 8–12; sheath hairy, keeled, truncate, callus minute or 0; auricles long, falcate, bristly, deciduous; ligule stiffly fimbriate. *Spikelets* sessile; bracts truncate; rachilla short, glabrous. *Stigmas* 3.—A very remarkable species with *Bromus*-like spikelets. Kurz enumerates 5 varieties in the "Indian Forester." (*B. atra* is its earliest name.—J. D. H.)

Sect. IV. Arborescent, not spinous. *Spikelets* cylindric, few-fld. *Lodicules* 0–3.

15. **B. schizostachyoides,** *Kurz ex Gamble Bamb. Brit. Ind.* 48, t. 44; leaves lanceolate to linear-lanceolate, sheath at first hispid truncate, callus 0, auricle falcate bearing long twisted stiff bristles, ligule long, panicle terminal spiciform, spikelets about ½ in. few in bracteate clusters, empty gls. 1–2 ovate mucronate many-nerved, flg. gls. 2–3 longer rough above, palea narrow keels ciliate, anthers long-apiculate, ovary elliptic-oblong, style long. Cephalostachyum schizostachyoides, *Kurz For. Fl. Burm.* 565. Melocanna? Kurzii, *Munro in Trans. Linn. Soc.* xxvi. (1868) 134. Teinostachyum schizostachyoides, *Kurz in Journ. As. Soc. Beng.* xxxix. (1870) ii. 89.

South Andaman Islds., *Kurz.*

Stems tufted, 20–30 ft. by 3–4 in. diam., green, glossy, nodes not thickened; internodes 1½–2 ft., walls thin; branches 1–4 from each node, leafy below, flowering above. *Leaves* 4–7 by ½–1¼ in., tip twisted scabrous, glabrous and pale beneath, nerves 5–6. *Bracts* of infl., narrow, truncate or acuminate, smooth, rachis pubescent, joints about 1 in. *Palea* membranous, acuminate, dorsally 3-nerved. *Lodicules* if present lanceolate, ciliate. *Anthers* purple, cells unequal. *Ovary* narrowed into the style. *Grain* obliquely oblong, smooth, beak long stiff.—Stem-sheaths not known. Remarkable for the narrow membranous acuminate palea.

Sect. V. Subscandent, not spinous. *Spikelets* cylindric, fl. gl. solitary.

16. **B. Griffithiana,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 99; leaves large lanceolate glaucous beneath base unequal cuneate tessellate by pellucid glands, sheath glabrous keeled callus narrow, auricles falcate reflexed strongly bristly, ligule elongate ciliate, spikelets about ½ in. in distant heads on a hollow soft rachis ovate-lanceolate acute, empty gls. 2 ovate acute many-nerved, flg. gl. larger mucronate, palea membranous acute keels glabrous, anthers obtuse tip 2-fid, ovary ovoid glabrous. *Gamble Bamb. Brit. Ind.* 49, t. 45. Dendrocalamus Griffithianus, *Kurz For. Fl. Brit. Burm.* ii. 562.—Bambusa, *Griff. Journ.* 90.

Upper Burma; banks of Mogaung River, *Griffith.*

Stems soft, slender, hollow. *Leaves* 1–1½ by 2–3 in., tip subulate, twisted, scabrid, nerves 13–17, petiole ⅕ in., stout; auricles of sheath up to ⅔ in., bristles long; ligule obtuse or triangular, often cleft. *Panicle* terminal, of spiciform branches bearing heads at intervals of 1–4 in. *Spikelets* cylindric; flg. gl. convolute; rachilla glabrous, clavate, much shorter than its imperfect terminal gl.; palea many-nerved. *Lodicules* 3, long-fimbriate, one much smaller. *Style* very short, stigmas long, plumose.

17. **B. Wrayi,** *Stapf in Kew Bulletin*, 1893, 14, in *Hook. Ic. Pl.* t. 2253; stems decurved, leaves linear-lanceolate narrowly acuminate, auricles of sheath small, ligule short truncate bristles long, panicle large leafy, spikelets in short bracteate spikes, within each bract is a keeled bracteole, then 2 imperfect spikelets in the axils of lanceolate glabrous gls. each subtended by a 2-keeled ciliate scale, fertile spikelet with ovate-lanceolate acute many-nerved, gls. keels of palea rough or faintly-ciliate, anthers obtuse glabrous, ovary ovoid glabrous. *Gamble Bamb. Brit. Ind.* 50, t. 46.

Malay Peninsula; Perak, alt. 4500–5500 ft., *Wray.*

Stems 40–60 ft., 1 in. diam., semiscandent, tips decurved to the ground, yellow, glabrous, shining, 3rd or 4th lower internodes up to 7 ft. *Leaves* 8–10 by 1 in., glabrous, petiole short narrow, nerves 7–8; sheath pale, glabrous, callus shining; hairs of ligule up to ½ in. *Panicle* large, leafy, clusters of spikelets at the nodes or in spiciform branches, rachis smooth. *Empty gl.* convolute, rachilla as long as its imperfect terminal gl. *Lodicules* narrow, minutely ciliate. *Ovary* narrowed into a very short style, stigmas long, plumose. *Grain* oblong, beak cylindric.

Sect. VI. Arborescent, spinous.

18. **B. Blumeana,** *Schult. f. Syst.* vii. 1343; stem-sheaths short, leaves fascicled linear-lanceolate sheath appressed hairy, ligule fimbriate, clusters of many imperfect and few perfect spikelets, perfect spikelets 1–1½ in. slender compressed, empty gls. 2–3 ovate acute 3–7-nerved, flg. gl. ovate acuminate 7–8-nerved, palea broad obtuse concave keels ciliate, anthers obtuse, ovary ovoid, style very short. *Kunth Enum.*

* *Pl.* i. 431; *Munro in Trans. Linn. Soc.* xxvi. (1868) 101; *Kurz Ind. Forester*, i. 340; *Gamble Bamb. Brit. Ind.* 50, t. 47. B. spinosa, *Blume ex Nees in Bot. Zeit.* (1825) 580. Ischnochloa spinosa, *Buse in Miq. Pl. Jungh.* 359. Schizostachyum Durie, *Rupr. Bamb.* 46.

MALAY PENINSULA; Pahang, *Ridley*.—DISTRIB. Malay Isls.

Stems 30–60 ft. or more, 3–4 in. diam., hard, smooth, glossy, nodes not prominent, walls thick; branches many, yellowish, copiously armed; spines short ternate, recurved. *Stem-sheaths* 5–6 by 3–4 in. broad, narrowed to a broad convex mouth, thick, coriaceous, hispid with stiff tawny bristles, young striped violet-brown and yellow; blade nearly as broad as the sheath, triangular, cuspidate, convolute, sides covered with tawny bristles, decurrent as a broad band ending in a rounded auricle, both lined with long stiff bent bristles; ligule narrow, toothed, long-fimbriate. *Leaves* 3–6 by ½–½ in., glabrous, base rounded, tip twisted scarious, glaucous beneath, nerves 5–7; sheath appressed hairy, callus recurved ciliate, mouth sparsely bristly; ligule truncate, fimbriate. *Panicle* large, terminal, branches spiciform. *Lodicules* 3, long-ciliate. *Grain* obovoid, shining above, tipped with the three stigmas.

19. **B. arundinacea,** *Willd. Sp. Pl.* 245; stem-sheaths long blade with felted hairs within, leaves linear or linear-lanceolate glabrous or slightly pubescent beneath, ligule short, spikelets ½–1 in. sessile lanceolate acute, empty gls. 0–2 ovate-lanceolate acute or mucronate many-nerved, fl. gls. 3–7 like the empty lower bisexual upper male with 2 or 3 uppermost imperfect, keels of palea ciliate, anthers yellow obtuse, ovary elliptic-oblong style short. *Retz. Obs.* v. 24 (Bambos); *Roxb. Cor. Pl.* i. 56, t. 79, *Fl. Ind.* ii. 191; *Poir. Encycl.* viii. 701; *Kunth Enum. Pl.* i. 431; *Rupr. Bamb.* 51, t. 13, f. 50; *Grah. Cat. Bomb. Pl.* 233; *Dalz. & Gibs. Bomb Fl.* 280; *Munro in Trans. Linn. Soc.* xxvi. (1868) 103; *Brand. For Fl.* 564; *Beddome Fl. Sylv.* t. ccxxi., *Forest. Man.* p. ccxxxi.; *Kurz For. Fl. Brit. Burm.* ii. 554; *Thw. Enum. Pl. Zeyl.* 375; *Trim. Cat. Ceyl. Pl.* 110; *Wall. Cat.* n. 5023 A; *Duthie Fodd. Gross. N. Ind.* 70; *Gamble Bamb. Brit. Ind.* 51, t. 48. B. Arondo, *Klein ex Nees in Linnæa*, ix. (1834) 471; *Rupr. Bamb.* 53, t. 13, f. 53; *Wight ex Steud. Nom. Ed.* II. i. 183. B. Neesiana, *Arn. ex Munro l. c.* B. orientalis, *Nees l. c.* 475; *Rupr. l. c.* 52, t. 13, f. 51; *Munro l. c.* 105; *Beddome l. c.* p. ccxxxi. B. puogens, *Blanco Fl. Filip. Ed.* I. 270. B. spinosa, *Roxb. Fl. Ind.* ii. 193; *Ham. in Trans. Linn. Soc.* xiii. (1822) 480; *Wall. Cat.* n. 5024; *Nees l. c.*; *Rupr. l. c.* 52, t. 12, f. 52, t. 13, f. 52; *Munro l. c.* 104; *Beddome l. c.*; *Brandis l. c.* 566; *Steud. Syn. Gram.* 329; *Benth. Fl. Hongk.* 434. Arondo Bambos, *Linn. Sp. Pl.* 81. 'Ily,' *Rheede Hort. Malab.* i. t. 16.

Throughout the Plains and low hills of INDIA and CEYLON, wild and cultivated. (Cultivated only in the lower Himalaya and in the valleys of the Ganges and Indus.)

Stems from a stout rootstock, 80–100 ft. and 6–7 in. diam., graceful and curving (or short and thickly branched), branched from the base; nodes prominent, lower with long horizontal shoots armed with 2–3 recurved spines; internodes up to 18 in., often subangular, the smaller flattened on one side, walls 1–2 in. thick. *Stem-sheaths* 12–15 by 9–12 in., coriaceous, young orange-yellow often striped green or red, top rounded, edges plaited, young thickly clothed with golden hairs; blade triangular, up to 4 in., acuminate, concave, glabrous without, matted within with dark bristles; margin involute, decurrent on the sheath, wavy, long and thickly ciliate, hardly auricled; ligule narrow, entire, or fringed with white hairs. *Leaves* up to 8 by 1 in., tip sharp stiff, base rounded ciliate, subtessellate by pellucid glands; sheath glabrous or nearly so, callus thick ciliate, auricle short. *Panicle* enormous, often occupying the whole stem; rachis usually ± ☭, shining, sometimes soft and angular. *Lodicules* 3, small, fimbriate. *Anthers* sometimes aristulate.—*Flowers*

gregariously and in small clumps. The following species of most authors are here united. The two first scarcely differ, the last seems more nearly a separate species and the remarkable rachis justifies its admission as a variety.—Further *B. arundinacea* shows two distinct varieties of habit, a tall handsome large stemmed one of the valleys of the Circars and hills of S. India (often cult. elsewhere); and an almost dwarf gregarious thick branched very thorny small-stemmed one 20 ft. high (probably Roxburgh's *B. spinosa*) which grows gregariously in the low hills and laterite downs of Orissa, Ganjam, Lower Bengal and Burma.

B. ARUNDINACEA; rachis of infl. very glabrous shining hard, spikelets few long 6–12-fld., rachilla evident hirsute, leaves smooth, sheath hairy.

B. SPINOSA, rachis striate hard not shining, spikelets many shorter 4–6-fld., rachilla obscure, leaves glabrous above hairy beneath, sheath hairy, then subglabrous.

B. ORIENTALIS; rachis glaucous green angled almost soft, spikelets membranous 5–8-fld., leaf-sheath hairy with white cilia, petiole hairy.

B. Species of which the flowers are unknown.

20. **B. auriculata,** *Kurz in Journ. As. Soc. Beng.* xxxix. (1870) 86; cæspitose, stem-sheaths strigose on the back, leaves lanceolate tessellate by pellucid glands, sheath smooth polished, auricle naked shining. *Gamble Bamb. Brit. Ind.* 55, t. 49. Gigantochloa auriculata, *Kurz For. Fl. Brit. Burm.* ii. 557.

ASSAM, SYLHET, CHITTAGONG & BURMA, *Mann, Kurz, &c.*

Evergreen. *Stems* 40–50 ft., 2–2½ in. diam., glossy, old yellow, young scurfy, branches decurved, nodes hardly thickened; internodes 18–30 in., lower shorter, walls thick. *Stem-sheaths* 10–12 in. by 9–10 in., base broad, convexly truncate where 4 in. broad; blade 6–9 in., triangular, acute, base slightly rounded decurrent and forming a rounded auricle; blade and sheath densely strigose except along the middle; ligule sharply toothed. *Leaves* 8–16 by 1–2½ in., petiole $\frac{1}{10}$–$\frac{1}{3}$ in., point twisted scabrid, nerves 8–12, shining; callus of sheath smooth; auricle thick, rounded, glossy.—Referred by Munro to *B. vulgaris*, but very distinct, and easily recognizable by the two hairy patches on the stem-sheath, and the thin blade.

21. **B. villosula,** *Kurz For. Fl. Brit. Burm.* ii. 553; stems solitary, stem-sheaths glabrous truncate ciliate blade 0, leaves linear glaucescent beneath tessellate by pellucid glands, callus of sheath shining, auricle solitary long-fringed. *Gamble Bamb. Brit. Ind.* 56.

MARTABAN & UPPER TENASSERIM, on limestone hills, *Brandis.*

Stems about 3 in. diam., nodes hardly raised, internodes 12–15 in. *Leaves* 5–8 by ½–¾ in., tip cuspidate setaceous twisted scabrid, nerves 6–12 inconspicuous; sheath minutely villous, then glabrescent, margins whitish-ciliate; ligule short.

22. **B. Mastersii,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 113; stem scandent reed-like, leaves oblong-lanceolate narrowed into a glandular (wrinkled?) often hairy petiole tessellate by oblique pellucid glands, tip beaked acuminate hairy, callus of sheath narrow, auricles with long stiff folded bristles. *Gamble Bamb. Brit. Ind.* 56.

ASSAM; at Dibrugarh, *Masters.*

Leaves 10–13 by about 1½ in., base yellowish, glaucescent beneath, costa yellowish shining, nerves 10–12 pairs; sheath striate, margins ciliate, sides appressed-bristly; ligule very short.

23. **B. marginata,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 114; stems tall scandent dark-colrd. fistular, branches deflexed, branchlets bracteate geniculate, lower internodes hirsute, leaves oblong-lanceolate margins towards the setaceously acuminate tip shaggy with thick silky

hairs, callus ciliate, ligule truncate toothed hairy outside. *Gamble Bamb. Brit. Ind.* 57.

TENASSERIM; top of Daunat range, alt. 5000 ft., *Brandis.*

Leaves 6–7 by 1–1¼ in., glabrous, base rounded, petiole $\frac{1}{10}$–$\frac{1}{3}$ in., costa yellowish, nerves 4–7 pairs, pellucid glands few; sheath striate, keeled, glabrous.—Perhaps a *Dinochloa.*

UNDETERMINABLE SPECIES.

B. ARISTATA, *Lodd. ex Lindl. in Penny Cyclop.* iii. 357.

135. THYRSOSTACHYS, *Gamble.*

Arborescent erect bamboos. *Stem-sheaths* elongate, thin, persistent; blade long, narrow. *Leaves* small or moderate sized. *Panicle* compound. *Spikelets* prominently bracteate, loose, pale, 2–3-fld., upper gl. fertile, terminal rudimentary on a produced rachilla; empty gls. 1–2, striate; flg. similar; palea of lower gl. 2-cleft, lobes caudiform, keels ciliate, of upper entire, elongate, not keeled; rachilla hairy. *Lodicules* 0–3, long-acuminate. *Stamens* 6, anthers mucronate. *Ovary* depressed-turbinate, style long, stigmas 2–3 feathery. *Grain* cylindric, long-beaked, glabrous, top shining, side grooved; pericarp crustaceous, adherent to the seed.

1. **T. Oliveri**, *Gamble Bamb. Brit. Ind.* 58, t. 50; stem-sheaths transversely truncate not auricled blade, long subulate, leaves long linear-lanceolate, panicle thyrsoid curved, spikelets ½–1 in., empty gls. 2 ovate acute sparsely hairy many-nerved, nerves trabeculate, flg. gls. similar, palea 3–5-nerved hairy between the keels.

UPPER BURMA, alt. 2000 ft., in moist forests, *Oliver;* Shan Hills, *Abdul Huk.*

Cœspitose. *Stems* straight from a stout rootstock, 50–80 ft. by 1–2½ in. diam., bright green, young silkily-downy old dull green or yellowish, nodes thickened; internodes 16–24 in., walls rather thin. *Stem-sheaths* persistent, shorter than the internodes, green to orange and brown, dorsally thickly pubescent, margins ciliate, not auricled; blade 8–9 by ¾ in., recurved, hairy above; ligule serrate. *Leaves* 7–8 by ½–⅔ in., roughish, base rounded, hairy beneath, nerves 6 pairs, pellucid glands irregular; sheath hairy, keeled; callus glabrous or hairy. *Thyrsus* bracteate at the nodes; rachis flexuous, hairy, top swollen; bracts ½–⅔ in., narrow, obtuse, sometimes foliiferous. *Spikelets* long and short, rachilla hairy. *Lodicules* 2, lanceolate, ciliate. *Filaments* purple, anthers yellow, connective obtuse. *Ovary* depressed turbinate, pedicelled, yellow, stigmas 3.

2. **T. siamensis,** *Gamble Bamb. Brit. Ind.* 59, t. 51; deciduous, stem-sheaths waved and truncate at top, auricles short triangular, blade narrowly triangular, leaves small narrow linear, panicle large, spikelets pedicelled fertile and sterile mixed, empty gl. solitary ovate acute 8-nerved base white-pubescent, flg. gls. 3 larger uppermost alone fruiting base and tip pubescent 14–16-nerved. Bambusa regia, *Thoms. ex Munro in Trans. Linn. Soc.* xxvi. (1868) 116 (*non Kurz*). B. siamensis, *Kurz mss.*

BURMA, from Mandalay to Tenasserim, *Brandis, Oliver.*—DISTRIB. Siam.

Stems cœspitose, very graceful, 25–30 ft., 1½–3 in. diam., branching towards the top only, branches after flowering often producing small-leaved tufts of wiry branchlets; nodes not prominent; internodes 8–11 in., with a white ring below the nodes. *Stem-sheaths* very persistent, 9–11 by 4½–8 in., thin, soft, white-pubescent; blade

4–5 in., margins recurved; ligule narrow, glabrous, ciliate. *Leaves* 3–6 by ⅓–½ in., glabrous or young puberulous, tips short twisted, costa narrow, nerves 3–5 pairs; sheath white pubescent and ciliate, truncate, callus glabrous; ligule short, ciliate. *Panicle* graceful, pale; branchlets many, thin, bearing bracteate clusters of few fertile spikelets mixed with sterile; bracts cymbiform, glabrous, tip truncate; rachis fine, wiry, curved, smooth, clavate. *Spikelets* whitish. *Palea* of upper fl. gl. longer than the gl., not keeled, concave, striate, glabrous, 2-mucronate, narrowed into a beak. *Lodicules* 0. *Ovary* at first ovoid, then depressed, flattened; style glabrous.

136. **GIGANTOCHLOA,** *Kurz.*

Arborescent or scandent. *Stems* unbranched below. *Stem-sheaths* usually stiff, hairy above, auricled. *Leaves* long. *Panicle* compound, branches long spiciform, bearing heads of few usually fertile and sterile spikelets. *Empty gls.* 2–3; fl. gls. similar. *Palea* of all the fl. 2-keeled, keels ciliate. *Lodicules* 1–3 or 0. *Stamens* 6, filaments connate into a short thick at length elongate membranous tube. *Ovary* hairy, stigmas 1–3 hairy. *Grain* usually oblong or linear and furrowed, pericarp membranous. Species about 11, chiefly Malayan.

* Spikelets oblong or ovoid, rounded, or flattened in *G. Scortechinii.*

1. **G. verticillata,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 124; spikelets 2–4-fld. $\frac{3}{10}$–$\frac{4}{10}$ in. ovate subacute glabrous, empty gls. 2–3 broadly ovate ciliolate, fig. gls. 3–4 similar many-nerved mucronate. *Gamble Bamb. Brit. Ind.* 61, t. 52. G. maxima, *Kurz in Tidschr. Ned. Ind.* xxvii. (1864) 226, *Ind. Forester*, i. 343. Bambusa verticillata, *Willd. Sp. Pl.* ii. 245. B. pseudarundinacea, *Steud. Syn. Gram.* 330.

Malay Peninsula, wild and cultivated.—Distrib. Malay Archipelago.

Stems tufted, 80–100 ft., 4–5 in. diam., young striped yellow, mealy and with appressed brown deciduous bristles; old gray-green; nodes hairy, not prominent; internodes 18 in., walls rather thin. *Stem-sheaths* 12 in. long, as broad or broader, rounded to the mouth with rounded ciliate auricles, clothed without with golden brown hairs, glabrous and shining within; blade short, recurved, ovate, acuminate, narrowly decurrent; ligule narrow. *Leaves* 10–15 by 1½–2½, base narrowed, top setaceous twisted scabrid, young hairy beneath, nerves 8–12; sheath truncate, young hairy, callus narrow, auricle short glabrous; ligule minute. *Rachis* and branchlets glabrous, smooth, slender. *Palea* of fig. gl. shorter than the gl. sometimes 2-mucronate, 3–5-nerved, ciliate on and between the keels. *Lodicules* variable. *Anthers* yellow. *Ovary* suborbicular, very hairy; style pubescent, stigmas 2–3.

2. **G. Scortechinii,** *Gamble Bamb. Brit. Ind.* 62, t. 53; spikelets trimorphous larger fertile, medium rigid, small sterile, fertile spikelet $\frac{7}{10}$–$\frac{9}{10}$ in. ovate acute flattened densely clothed with silvery grey hairs, empty gls. 2–3 ovate mucronate, fl. gls. longer.

Malay Peninsula, *Scortechini*, &c., alt. 400–600 ft.

Gregarious, forming forests. *Stems* 40–80 ft., 4–6 in. diam. *Leaves* linear-lanceolate, 12–16 by 1–1½ in., often unequal sided, base narrowed, tip acuminate twisted scabrid, softly hairy beneath, tessellate by pellucid glands; sheath densely pubescent, callus pubescent; auricle small, rounded, fringed with bristles; ligule short, hairy. *Panicle* compound, of curved spiciform branchlets bearing whorls of distichous heads 1–2 in. apart. *Spikelets* 2–5 fertile in each head mixed with sterile, rachis pubescent; uppermost fig. gl. convolute; palea shorter than the gl., 6-nerved

between the 2 ciliate keels, top 2-fid. *Lodicules* 0. *Anthers* yellow, long-apiculate. *Ovary* rounded, style glabrous. *Grain* obtuse, glabrous.

** Spikelets narrow, cylindric, acute.

† *Leaf-ligule short.*

3. **G. macrostachya,** *Kurz For. Fl. Burm.* ii. 557; nodes hairy, leaves lanceolate whitish and softly puberulous beneath, spikelets 1–2 in. linear-subulate, gls. fringed with black hairs, empty gls. 2–3 ovate mucronate dorsally many-nerved with a few bristles, flg. gls. 2–3 longer linear-lanceolate convolute, palea very narrow keels white-ciliate dorsally 3–5-nerved. *Gamble Bamb. Brit. Ind.* 63, t. 54.

Assam; Garrow Hills, *Mann.* Chittagong, Arracan, & Burma, *Kurz*, &c.
Evergreen. *Stems* 30–50 ft., 2½–4 in. diam., fistular, young glaucous, old dark green, sometimes striped; nodes scarcely thickened; internodes 16–30 in., lower shorter, walls $\frac{2}{10}$–$\frac{3}{10}$ in. thick. *Stem-sheaths* 5–8 in. long, up to 14 broad, top truncate, densely covered with blackish hairs; blade as long or shorter, reniform, acute, appressed hairy beneath, base rounded dilated into a long-fringed band ½–1 in. broad with rounded auricles; ligule narrow. *Leaves* thin, lanceolate, 6–15 by ½–2 in., tip setaceous scabrid, margins scabrous, midrib narrow, nerves 5–13; sheath hairy, at length glabrous; callus rounded, auricles 1 or 2 ciliate; ligule short. *Panicle* large, leafy, branchlets spicate; spikelets 1–2 in., clustered, fertile and sterile. *Lodicules* 0. *Anthers* purple, tips setaceous. *Ovary* ellipsoid, style long curved hairy, stigma undivided. *Grain* linear, puberulous above.—The leaves resemble *Bamb. Tulda*; the sheaths *B. nutans* and *teres*; the spikelets *Oxytenanthera nigro-ciliata.*

4. **G. Wrayi,** *Gamble Bamb. Brit. Ind.* 64, t. 55; branchlets scurfy glaucous, leaves large oblong-lanceolate cuspidate shortly petioled strigose beneath, spikelets ¾ in. conical acute, gls. fringed with black hairs, empty gls. 2–3 ovate mucronate striate, flg. gls. 3–4 longer narrower, palea narrowly oblanceolate keels faintly ciliate 5–7-nerved.

Malaya; Perak, at Bakit Gantang, *L. Wray.*
Stems 3 in. diam. *Leaves* 12–15 by 2–2½ in., tip setaceous, scabrous, midrib broad yellow, nerves 10–12 pairs, nervules of pellucid glands; sheath smooth, keeled, mouth and short auricle fringed with long stiff white bristles, callus narrow; ligule short, puberulous. *Panicle* compound, branchlets spiciform, fertile spikelets few, sterile shortly bracteate, rachis curved. *Spikelets* subcompressed; empty gls. 2–3, flg. gls. narrower. *Lodicules* 0. *Anthers* long, narrow, tips elongate setaceous hairy. *Ovary* hairy, style slender pubescent, stigma broadly plumose.

5. **G. Kurzii,** *Gamble Bamb. Brit. Ind.* 65, t. 56; leaves linear-lanceolate base cuneate petioled sparsely hairy beneath, spikelets ½ in. acute, gls. fringed with brown hairs, empty gls. 2–3 ovate mucronate many-nerved, flg. gls. 2–3 longer narrower terminal imperfect, palea linear obtuse 3–5-nerved keels ciliate.

Tenasserim, *Kurz.* Perak, *Ridley.*
Stem-sheaths 6 by 3 in., cylindric, truncate, glabrous; blade longer, recurved, lanceolate, decurrent in a narrow black band lining the top of the sheath, ending in a naked round auricle. *Leaves* 8–13 by ½–1½ in., petiole ⅛ in., midrib narrow, nerves 8–11 pairs; young sheath appressed hairy, truncate, auricles rounded; ligule short. *Panicle* leafy, branchlets spicate. *Spikelets* 2–3 in. in heads with narrow bracts. *Anthers* obtuse, apiculate. *Ovary* stipitate, puberulous, style long, stigma plumose. *Grain* (young) glabrous.

†† *Leaf-ligule long.*

6. **G. heterostachya,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 125; subscandent, leaves linear-lanceolate base rounded shortly petioled tip setaceous twisted scabrous sparsely hairy on the midrib beneath, spikelets dimorphic sterile ½–¾ in., fig. 1–1¼ in. oblong compressed, empty gls. 1–3 ovate glabrous, fig. gls. 4–5 with 1–2 imperfect convolute, palea short obtuse 4–8-nerved keels ciliate. *Kurz Ind. Forester*, i. 345; *Gamble Bamb. Brit. Ind.* 66, t. 57. Bambusa hetirostachya, *Munro in Herb. Trin. Coll. Dublin, fide Munro* l. c. 126.

MALAY PENINSULA; near Ayer Punas, about houses, *Griffith.*

Stems 30 ft., graceful, thin-walled. *Leaves* 4–11 by ½–1 in., midrib narrow shining, nerves 6–8; sheath striate, auricle and callus rounded glabrous; ligule long, toothed, sometimes long-ciliate. *Panicle* large, leafy, branches spiciform, heads of spikelets ½–4 in. apart, in the axils of chaffy glabrous bracts, rachis smooth, upper joints puberulous; fig. spikelets sometimes solitary, empty gls. with sometimes an imperfect fl. *Lodicules* 2 (or 3 ?) ovate or oblong, long-fimbriate. *Anthers* nearly ½ in., tip apiculate penicillate. *Ovary* ellipsoid, very hairy; style often curved, hairy; stigmas 2–3, plumose.

7. **G. ligulata,** *Gamble Bamb. Brit. Ind.* 67, t. 58; leaves large oblong-lanceolate base wrinkled unequal narrowed into a flat petiole, tip acuminate with reflexed margins scabrous, ligule long 2-fid, spikelets ½–¾ in., conical acuminate, gls. ciliate with brown hairs, empty gls. 2–4 ovate acute mucronate many-nerved, fig. gls. longer, palea short 5-nerved keels long-ciliate.

MALAY PENINSULA; Perak, *Wray*; Pahang, *Ridley.*

Leaves 12–16 by 2–3 in., beneath pale and smooth except the scabrid tip, midrib broad yellow beneath, nerves 12–14 pairs, cross-nervules of pellucid glands; sheaths smooth, shining, brown, striate; callus rounded, shining, often ciliate; ligule up to 1 in., glabrous, lobes long-acuminate, membranous. *Panicle* terminal, long, of spiciform branchlets bearing distant heads on leafy branches, each with 5–8 fertile spikelets in the axils of long yellow glabrous bracts ½–1½ in. long, mouth of bracts truncate, furnished with round dark naked auricles and long fimbriate ligules, rachis fistular, glaucous, lower joints 3 in. *Lodicules* 0. *Anthers* long-apiculate, tip hairy. *Ovary* long-stipitate, depressed ovoid, shining, hairy, style slender, stigma short plumose.

8. **G. latispiculata,** *Gamble Bamb. Brit. Ind.* 67, t. 59; leaves broadly lanceolate petioled base cuneate glabrous except the scabrid tips, ligule broad cleft, spikelets over 1 in., nearly glabrous, empty gls. 2–3, lower foliiferous ovate-lanceolate mucronate, fl. gls. 7–9 ovate-lanceolate long-acuminate hairy within margins faintly ciliate, palea shorter obtuse 7-nerved keels ciliate.

MALACCA, *Alwis.*

Stems 50 ft. *Leaves* 12–14 by 1–1¼ in., pale, midrib prominent shining, nerves 8–9 pairs obscure; sheath smooth, glabrous, keeled, callus narrow. *Panicle* terminal, of spiciform branchlets bearing distinct heads 1–3 in. apart, of 1–4 very large flattened spikelets ¼–⅓ in. broad, rachis smooth striate; bracts very small. *Lodicules* small, obovate, 3–5-nerved, fimbriate. *Anthers* narrow, tips apiculate, penicillate. *Ovary* narrowly ovoid, pubescent, style slender, stigmas 3 plumose.

137. **OXYTENANTHERA**, *Munro.*

Arborescent or scandent unarmed Bamboos, with a stout usually creeping and stoloniferous rootstock. *Stem-sheaths* various. *Leaves* large or small, shortly petioled. *Panicle* large, branches with few or many heads of whorled or capitate spikelets. *Spikelets* elongate, cylindric or

conical, 1–3-fld., terminal fl. usually fertile; empty gls. 1–3; fl. gls. elongate, mucronate. *Palea* of lower flS. 2-keeled, of uppermost convolute keel 0 or obscure. *Lodicules* 0. *Stamens* as in *Gigantochloa*. *Ovary* ovoid, style slender, stigmas 1–3 more or less plumose. *Grain* elongate, beaked, smooth.—Species the following and a tropical African.

* *Heads usually of few spikelets.* (Burmese and Malay species.)

1. **O. nigrociliata**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 228; auricles of stem-sheaths naked, spikelets 1 in., gls. fringed with black or purple cilia many-nerved, empty gls. 2–3 ovate acute and mucronate, flg. gls. 2–3 and a terminal imperfect lanceolate acuminate long mucronate, palea narrow 2–3-nerved between the ciliate keels, anther tips elongate slender hirsute. *Beddome Fl. Sylvat., Forest. Man.* p. ccxxxiii.; *Gamble Bamb. Brit. Ind* 69, t. 60. Bambusa nigrociliata, *Büse in Pl. Jungh.* i. 389; *Miquel Fl. Ind. Bat.* iii. 416. B. Bitung, *Hassk. Pl. Jav. Rar.* 42. B. gracilis, *Wall. Cat.* n. 5033. Gigantochloa nigro-ciliata, *Kurz Ind. Forest.* i. 345. G. andamanica, *Kurz For. Fl. Burma*, ii. 566.

Orissa, Chittagong, Burma, the Malay Peninsula, and the Andaman Islds. ? Garrow Hills.—Distrib. Sumatra, Java.

Stem 30–40 ft. by ½–2 in. diam., sometimes striped with yellow, internodes scabrous. *Stem-sheaths* about 6 in., margins ciliate, narrowed to the truncate tip, dorsally strigose; blade ovate-lanceolate, decurrent; auricle bright green, rounded, naked, hairy within; ligule narrow. *Leaves* 6–12 by 1–2 in., lanceolate, tip subulate twisted, base unequal and rounded or narrowed, scaberulous above, pale and at first pubescent beneath, midrib prominent, nerves 9–12, glands like nervules; sheath stiff, hairy at first only, margins ciliate, auricles rounded naked; ligule narrow. *Panicle* large, compressed; rachis of branches pubescent. *Spikelets* in distant whorls of 3–6. *Anthers* ¼–⅓ in., narrow, purple. *Ovary* pubescent. *Grain* linear-oblong, dorsally grooved, beak penicillate.

2. **O. albo-ciliata**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 129; spikelets $\frac{6}{10}$–$\frac{8}{10}$ in., often curved mixed with yellow chaffy white-ciliate bracts fertile and a few sterile together, gls. white-ciliate, empty gls. 1–2 ovate acute, flg. gls. elliptic acute or faintly notched many-nerved convolute 2–3 lowest male, upper 1 or 2 bisexual, anthers with long hirsute tips. *Gamble Bamb. Brit. Ind.* 70, t. 61. Gigantochloa albo-ciliata, *Kurz For. Fl. Burma*, ii. 555.

Throughout Burma, *Falconer*, &c.

Stems 20–30 ft. by ½–1 in. diam., densely tufted, greyish-green, curved, nodes raised; internodes 6–15 in., hispid above, walls ⅕–⅓ in. thick. *Stem-sheaths* 4–8 by 6 in., tawnily strigose, then glabrous, base coriaceous folded, mouth narrow ending in a slightly auricled naked band; blade lanceolate, base rounded and decurrent; ligule ½–1 in., toothed. *Leaves* 6–8 by ¾–1 in., linear-lanceolate, tip setaceous, base rounded, shortly petioled, glabrous on both surfaces, nerves 6–8, pellucid glands like nervules; sheath smooth, striate, truncate, callus smooth; ligule rather long. *Panicle* large, spreading; branches smooth, slender, with distant whorls of 10–20 spikelets. *Ovary* acuminate, pubescent. *Grain* oblong, acuminate.

3. **O. sinuata**, *Gamble Bamb. Brit. Ind.* 71, t. 62; leaves large softly pubescent beneath, panicle-branches softly tomentose, spikelets sterile and fertile mixed, $\frac{3}{10}$–$\frac{4}{10}$ in. in small heads conical puberulous, gls. ciliate many-nerved, empty gls. 2–3 ovate mucronate, fl. gls. 2–3 longer fertile uppermost convolute, lower paleæ 2–3-nerved between the ciliate keels, tip of narrow anthers slender hairy.

MALAYA; Sunjei Ulong. JOHORE, *Ridley* (var. with glabrous spikelets).

Leaves 10–12 by $1\frac{1}{4}$–$1\frac{1}{2}$ in., oblong-lanceolate, acuminate, base rounded or subcordate, petiole broad hairy, tip setaceous scabrid twisted scaberulous above, midrib faint, nerves 10–12 pair; sheath glabrous or puberulous, keeled, striate, ending in a narrow ciliate callus; ligule rather short, thickly pubescent. *Panicle* with slender sinuous branches, internodes $\frac{1}{2}$–$1\frac{1}{2}$ in. *Ovary* broadly ovoid, style hairy, stigma plumose.

4. **O. parvifolia,** *Brandis ex Gamble Bamb. Brit. Ind.* 72, t. 63; leaves 3–5 by $\frac{1}{2}$ in. linear-lanceolate puberulous beneath, spikelets narrow $\frac{2}{3}$–$\frac{3}{4}$ in. 4–10 in a whorl with polished bracts, rachis slender wiry, gls. ciliate fertile and sterile mixed, empty gls. 2–3 ovate mucronate glabrous, fl. gls. similar but longer usually 2 fertile and 1 imperfect, palea 2–3-nerved between the shortly ciliate keels, anthers short obtuse.

BURMA; in the Yônzalin Valley, *Brandis.*

Stems up to 3 in. diam. *Stem-sheaths* 8–9 by 8–10 in., strigose with brown hairs, top truncate striate; blade 2–3 by 1 in, base rounded and decurrent in a narrow naked subauricled band; ligule long, rather broad. *Leaves* shortly petioled, base rounded, tip subulate twisted, pale and puberulous beneath; sheath at first hairy, ending in a prominent callus bristly at the top. *Panicle* of long glabrous branches, with internodes 1–2 in. *Spikelets* glabrous; empty gls. striate towards the tip. *Ovary* hairy, style long slender, stigmas 1–2 plumose.

** *Heads of many spikelets.*—South Indian species.

5. **O. Thwaitesii,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 129; stem reed-like straggling, leaves up to 8–12 by 1–$1\frac{1}{2}$ in., spikelets $\frac{1}{4}$–$\frac{1}{2}$ in. in dense heads with ovate bracts acute pale usually 1-fld., rachis smooth, gls. with more or less ciliate margins, empty gls. 2–3 ovate mucronate many-nerved, flg. gl. ovate acute cuspidate pubescent above, palea convolute, anther-tips long hairy, stigmas 3. *Beddome Fl. Sylv.* t. cccxxii.; *Forest. Man.* p. ccxxxii.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 73, t. 64. Dendrocalamus monadelphus, *Thwaites Enum. Pl. Ceyl.* 376.

NILGHIRI and TRAVANCORE HILLS, alt. 3500–6000 ft. CEYLON, alt. 4–6000 ft.

Stems 10–12 ft. by 1 in. diam., gregarious, straggling or subscandent, smooth; branches whip-like, branchlets whorled and sheathed, nodes prominent, internodes 12–18 in. rough, young hirsute, walls $\frac{1}{10}$–$\frac{2}{10}$ in. thick. *Stem-sheaths* about 6 by 3–4 in., of young shoots glabrous yellow shining, of old strigose with light brown hairs, ending in a coriaceous separable ciliate ring; blade 3–5 by 1 in., base rounded decurrent in rounded falcate auricles, pectinately ciliate with long curved bristles; ligule of old sheaths long-fimbriate, of young narrow erose. *Leaves* with twisted setaceous tips, sparsely hairy beneath, midrib narrow yellow, nerves 4–5 pairs, pellucid glands few; sheath often hirsute keeled, callus rounded, young with falcate bristly auricles; ligule long. *Panicle* very large, leafy; lower heads $1\frac{1}{2}$–2 in. diam., upper smaller with fewer spikelets. *Ovary* ovoid and style pubescent. *Grain* $\frac{1}{5}$–$\frac{1}{3}$ in., glabrous, mucronate.—Easily recognized by the whip-like climbing branches and long-ciliate sheaths.

6. **O. monostigma,** *Beddome Fl. Sylv. Forest. Man.* p. ccxxxiii., and *Ic. Pl. Ind. Or.* i. 56, t. 234; stem solid velvety-tomentose pale yellow, leaves 6–8 by $1\frac{1}{2}$ in. linear-lanceolate, spikelets $\frac{3}{4}$–1 in. in globose heads fertile and sterile spinescent, glabrous, empty gls. mucronate 2–3 lower small ovate, upper ovate-lanceolate, flg. long linear-lanceolate long-mucronate convolute, palea concave not keeled obtuse, anthers tipped with a long hairy bristle, stigma 1. *Gamble Bamb. Brit. Ind.* 74, t. 65. Bambusa Ritcheyi,

Munro in Trans. Linn. Soc. xxvi. (1868) 113. Schizostachyum hindostanicum, *Kurz in Journ. Beng. As. Soc.* xlii. (1873) II. 252.

WESTERN GHATS, from the Concan to the Anamalai Hills.

Stems 10–15 ft. or more by 1 in. diam., internodes long. *Stem-sheaths* 6–9 by 3 in. broad at the base, narrowed from the base up to the 2-lobed tip; blade in the sinus, 3 in., linear-lanceolate; ligule long, fimbriate. *Leaves* variable, shortly petioled, pale green, tip setaceous twisted, base unequal rounded, sparsely hairy beneath, midrib beneath yellow shining, nerves 7–12; sheaths striate; ligule long. *Panicle* large, terminal, rachis smooth, heads of spikelets up to 2½ in. diam. *Ovary* ovoid, acuminate and style glabrous, stigma thickened. *Grain* narrow, tipped with the conic style-base.

7. **O. Stocksii**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 130; stems glabrous or softly pubescent, leaves 4–8 by ½–⅔ in., spikelets ½ in. in globose heads spinescent glabrous fertile and sterile, empty gls. 2 ovate mucronate 5–7-nerved, fl. gls. 2 ovate subacute dorsally mucronate, anthers short acute, stigma 1. *Beddome Fl. Sylvat., Forest. Man.* p. ccxxxiii.; *Gamble Bamb. Brit. Ind.* 75, t. 66.

The CONCAN, *Stocks*, &c. (usually cultivated).

Stems slender, grey-green, solid, or tube slender, nodes with a softly pubescent ring; internodes 6–12 in. *Stem-sheaths* 6–9 in. by 3–7 at the base, tapering upwards to a retuse tip, densely brown, strigose, margins ciliate; blade subulate, base dilated into a rounded fringed auricle; ligule ⅛ in., deeply fimbriate. *Leaves* very shortly petioled, tip setaceous, base rounded or cuneate, beneath glabrous or hairy, midrib narrow, nerves 5–6; sheath striate; ligule rather long, toothed. *Panicle* large; heads 1 in. diam., mixed with chaffy bracts, rachis smooth, internodes 1–2 in. *Anthers* short, acute. *Ovary* and long style hairy, stigma simple, plumose.

8. **O. Bourdilloni,** *Gamble Bamb. Brit. Ind.* 76, t. 67; stem-sheaths coriaceous nearly glabrous, leaves 6–9 by 1–1½ in., mouth of leaf-sheath with 2 shining calli, spikelets ⅔–¾ in. in globose heads glabrous, rachis soft, empty gls. 2 ovate mucronate many-nerved, fl. gls. 3, mucronate lowest much longer than the next, rachilla ciliate and bearing a setaceous gl., anthers apiculate, stigmas 3, short.

TRAVANCORE; on the Ghats, alt. 3–4000 ft., *Bourdillon.*

Stem in open clumps of straggling habit, soft, internodes long. *Stem-sheaths* 6–12 by often 6 in., glabrous, except a few black bristles below, slightly narrowed upwards, tip truncate; blade 2–3 in., triangular, decurrent and forming two rounded recurved entire wings that line the upper edge of the sheath; ligule short. *Leaves* shortly petioled, thin, tip twisted, scabrous covered above with scabrid papillæ near the margins and midrib, smooth beneath; midrib narrow, nerves 7–8; sheath soft, striate; ligule long, serrate. *Panicle* large spikelets in globose heads 1½–2 in. diam., rachis fistular. *Palea* of lower fls. 3-nerved between the ciliate keels, rachilla ciliate with a terminal imperfect gl. *Ovary* and *style* hairy. *Grain* linear-oblong, tipped with the thickened style-base.

138. DENDROCALAMUS, *Nees.*

Arborescent unarmed Bamboos, with densely branching rootstocks. *Leaves* shortly petioled, transverse nervules represented by pellucid glands. *Spikelets* in globose clusters on the long branches of a compound panicle, ovate, 2–6-fld.; empty gls. 2–3, ovate, acute, many-nerved; flg. gls. like the empty; palea of lower fls. keeled, of upper dorsally rounded eciliate. *Lodicules* 0 or rare. *Stamens* 6, filaments free. *Ovary* hairy above, often

depressed, stigma usually simple. *Grain* small, pericarp coriaceous or crustaceous.—Species 16 known.

Sect. I. *Spikelets* hard, spinescent, crowded in spicate heads.—Leaves usually narrow.

1. **D. strictus,** *Nees in Linnæa*, ix. (1834) 476; leaves up to 10 by 1¼ in., shortly suddenly petioled softly hairy beneath, spikelets ¼–½ in. hairy spinescent fertile and smaller sterile mixed, empty gls. 2 or more ovate spinescent many-nerved, fig. gls. ovate tip spinescent and pubescent, palea of lower 6–7-nerved between the ciliate keels, anthers apiculate. *Miq. Fl. Ind. Bat.* iii. 421; *Munro in Trans. Linn. Soc.* xxvi. (1868) 147; *Beddome Fl. Sylvat.* t. cccxxv., *Forest. Man.* p. ccxxxv.; *Brandis For. Fl.* 569, t. 70; *Kurz For. Flor. Burma*, ii. 558, *Ind. Forester*, i. 346; *Aitchis. Cat. Panjab. Pl.* 171; *Duthie Fodd. Grass. N. Ind.* 71; *Gamble Bamb. Brit. Ind.* 78, t. 68, 69. Bambos stricta, *Roxb. Corom. Pl.* i. 58, t. 80. Bambusa stricta, *Roxb. Fl. Ind.* ii. 193; *Kunth in Journ. Phys.* xlv. (1822) 148; *Enum. Pl.* i. 431; *Ruprecht Bamb.* 56, t. 12, f. 56; *Steud. Syn. Gram.* 330; *Dalz. & Gibs. Bomb. Fl.* 299. B. verticillata, *Rottl. ex Munro l. c.* B. pubescens, *Lodd. ex Lindl. in Penny Cyclop.* iii. (1835) 357. B. Tanæa, *Ham. ex Wall. Cat.* n. 5038 A.—Bambusa, *Wall. Cat.* n. 5038.

Dry hills of N. INDIA, from Garwhal to Nepal and southward from the PANJAB to BEHAR, the CONCAN, CENTRAL and S. INDIA, BURMA, and GREAT COCOS ISLD. (Not in Ceylon.)—DISTRIB. Java.

Stems 20–50 ft. by 1–3 in. diam., hollow in moist climates, solid in dry, young glaucous green, old yellowish, nodes swollen, lower often rooting, internodes 12–18 in., upper branches decurved. *Stem-sheaths* variable, lower 3–12 in., glabrous or strigose with yellow-brown hairs, striate, top rounded ciliate, slightly auricled; blade triangular, hairy, especially within; ligule narrow. *Leaves* deciduous, narrowed from the rounded petioled base to the twisted tip, midrib prominent, nerves 3–6 pairs with interposed pellucid glands; sheath striate hairy, callus prominent, auricle short ciliate with flexuous deciduous hairs; ligule narrow, serrate. *Panicle* large, heads dense, 1–1½ in., much smaller in S. Indian forms; rachis smooth, internodes 1½–2 in. *Spikelets* usually hairy. *Ovary* stipitate, turbinate, style long, stigma simple feathery. *Grain* broadly ovoid, shining, beaked, hairy above.

Var. *Prainiana*, Gamble l. c. 80, t. 69, fig. A.; spikelets smaller, fls. fewer, fl. gls. nearly glabrous. Great Cocos Isld., *Prain.*

2. **D. sericeus,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 148; characters of *D. strictus*, but spikelets silkily hairy, anther-tips obtuse. *Gamble Bamb. Brit. Ind.* 81, t. 70.

BEHAR, summit of Parus-nath, alt. 4000 ft., *J. D. H.*, &c.

(I should regard this as a variety of *D. strictus* had it not been retained by Munro & Gamble. The latter describes the empty gls. as obtuse, but they are acute in the plate referred to.—J. D. H.)

3. **D. membranaceus,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 149; stems scurfy when young, leaves 5–10 by ½–¾ in. hispid above, spikelets ½ in., glossy nearly glabrous, empty gls. 2 ovate obtuse or acute, fl. gls. 2–3 ovate mucronate glabrous margins often ciliate, anthers apiculate. *Kurz For. Fl. Burma*, ii. 560; *Gamble Bamb. Brit. Ind.* 81, t. 71.

EASTERN BURMA, *Wallich*, &c.

Closely resembles glabrous forms of *D. strictus*, but stem-sheaths with waved hairy auricles, leaves thinner, base less rounded, grain more elongate, and grooved.

Sect. II. *Spikelets* in large soft congested heads. *Leaves* usually broad.

4. **D. sikkimensis,** *Gamble in Hook. Ic. Pl.* t. 1770, *Bamb. Brit. Ind.* 82, t. 72; stem-sheaths felted with golden brown hairs, leaves 6–10 by 1½–2 in. oblong-lanceolate strigosely hirsute and rough beneath, mouth of leaf-sheaths fringed, spikelets ½–⅔ in. in large globose red-brown heads lanceolate subobtuse glabrous, empty gls. 3–4 ovate keeled keels ciliate, flg. gls. 2–3 ovate mucronate glabrous margins ciliate, anthers acute. *Gard. Chron.* (1890), i. 792, fig. 130, II. 279 (1892), ii. 675 *cum Ic.*

Eastern Himalaya; Sikkim and Bhotan, alt. 4–6000 ft. Garrow Hills, on Tura Peak, alt. 3500 ft.

Stem 50–60 ft. by 5–7 in. diam., naked below, dark green, nodes ringed, internodes 18 in., rough. *Stem-sheaths* 12 by 15 in., top broad; blade lanceolate, recurved, hairy on both surfaces, decurrent into two large falcate recurved auricles fringed with long curved pale bristles; ligule sharply serrate. *Leaves* variable, tip black twisted, base rounded, smooth above, midrib prominent, nerves about 10 pairs; sheath smooth, callus small ciliate, auricles fringed with stiff bristles; ligule short, fimbriate. *Panicle* large, branches nodose, heads of spikelets 1½ in. diam., rachis dull brown puberulous, internodes about 2 in. *Palea* of lower fl. obtuse, keels shaggy many-nerved. *Ovary* subglobose, hairy; style short, thick, and clavate stigma hairy. *Grain* depressed obovoid, apiculate, wrinkled below.

5. **D. Hookeri,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 151; stem-sheaths felted with black or brown hairs, leaves 10–12 by 2 in. or more oblong-lanceolate rough beneath, mouth of leaf-sheath not fringed, spikelets about ⅓ in. in large heads ovate acute puberulous, empty gls. 2 ovate obtuse, flg. gls. 2–3 ovate acute many-nerved uppermost mucronate, anthers long tips penicillate. *Brandis For. Flor.* 570; *Gamble Bamb. Brit. Ind.* 84, t. 73. Bambusa globifera, *Griseb. in Goett. Nachr.* (1868), 72.

Sikkim Himalaya, *Anderson*, &c. Assam, the Khasia, Jaintea, and Duphla Hills, alt. 2–5000 ft., *J. D. H. & T. T.*, &c. Burma; Bhamo district, *Oliver*.

Stem 50–60 ft. by 4–6 in. diam., naked below, internodes 18–20 in., lower somewhat rough and hairy, walls about 1 in. thick; branches long, curving. *Stem-sheaths* large, old very broad, younger about 16 in. by 8–12 broad at the base, top 2–3 in. broad; auricles 2, rounded, ciliate with stiff hairs; blade 3–7 in., triangular, hairy above; ligule ⅕–⅓ in., sharply serrate. *Leaves* oblong-lanceolate, tip long twisted hispid, base rounded very shortly petioled, midrib very prominent yellow, nerves 8–16 pairs, tessellate by pellucid glands (seen when dry); sheath hairy below, shining above, truncate, sometimes sparingly hairy, callus large; ligule conspicuous, glabrous. *Panicle* large, internodes 2–3 in., dull grey-green, somewhat hirsute; heads of spikelets 1 in. diam.; fl. gls. with transverse nervules. *Ovary* ovoid, acuminate, hairy, style twisted, stigma plumose.

6. **D. Hamiltonii,** *Nees & Arn. ex Munro in Trans. Linn. Soc.* xxvi. (1868) 151; stem-sheaths glabrous, leaves broadly lanceolate cuspidate, spikelets nearly ½ in. long ovoid depressed purple glabrous, empty gls. usually 2 short rounded nerved, flg. gls. 2–4 orbicular margins ciliate, anthers purple with a long black hairy twisted point. *Brandis For. Fl.* 570. Bambusa monogyna, *Griff. Notul.* 63, *Ic. Pl. Asiat.* t. 2. B. maxima, *Ham. ex Wall. Cat.* n. 5039. B. Falconeri, *Munro l. c.* 95, *in part.*

Tropical Himalaya; from Garwhal (cult. ?) to Sikkim, Assam, the Khasia Hills, and Silhet.

Stems up to 80 ft. by 4–7 in. diam., much branched above, young appressedly white-pubescent, nodes with root-scars; internodes 12–20 in., walls ½ in. thick.

Stem-sheaths glabrous or with patches of appressed hairs, tip truncate, auricles acute ; blade lanceolate, acute, with a small glabrous triangular point on each side, often 12 in., glabrous, margin incurved, with black bristles at the base within; ligule $\frac{1}{5}$ in., smooth, entire. *Leaves* variable, small on side branches, up to 15 by $2\frac{1}{2}$ in. in new shoots, base rounded shortly petioled, tips scabrous twisted, margin finely serrate, midrib very narrow, nerves 6–17 pairs with nervules of pellucid glands ; sheaths glabrous above, below clothed with white appressed stiff hairs, subkeeled below the shining callus ; ligule broad. *Panicle* very large, branches scabrous and white-pruinose, furrowed on one side ; internodes 1 in. or less, thick, fistular, scabrid ; heads hemispheric, $\frac{1}{2}$–$1\frac{1}{2}$ in. diam. ; spikelets usually all fertile, surrounded with rounded scarious bracts. *Ovary* subglobose, hairy, style long, stigma 3-fid feathery. *Grain* broadly ovoid, beaked, glabrous or hairy above.

7. **D. patellaris**, *Gamble Bamb. Brit. Ind.* 86, t. 75 ; stem-sheaths long cylindric margins above with a broad membranous fimbriate wing, leaves 8–16 by 1–4 in. lanceolate base narrow, spikelets depressed-ovoid obtuse, gls. all orbicular cuspidate many-nerved and palea tomentose within, empty gls. 1–2 membranous, flg. 3–5, anthers purple tip conical hairy. Bambusa patellaris, *Kurz in Herb. Calcutt.*

SIKKIM HIMALAYA ; below Tonglo, alt. 4000 ft., *Anderson*, &c. NAGA HILLS, *Mann.*

Stems 20–30 ft. by 1–$1\frac{1}{2}$ in. diam., dull green, striate, nodes with a hairy belt, internodes 12–18 in., walls thin. *Stem-sheaths* very persistent, 10–12 in. by 3 in. broad, sparsely strigose, glabrous within, narrowed in upper third to a truncate top, margins winged for 1–2 in. ; limb 6 in., lanceolate ; ligule fringed. *Leaves* persistent, petioled, variable, soft, tip twisted scabrid, midrib stout, nerves 8–10 pairs ; sheath striate, keeled, truncate, or produced into a narrow callus, margins fringed ; ligule very large, fimbriate. *Panicle* very large, rachis of branches rough, fistular ; heads distant, distichous, $\frac{1}{2}$-1 in. diam., bearing hard shining bracts. *Spikelets* many, dark brown, rachilla produced with a terminal imperfect gl. *Lodicules* 0 or 2, narrow, long-ciliate. *Ovary* ovoid, style hairy, stigmas 3.

Sect. III. Spikelets few, in small heads, many sterile.

* *Spikelets long, ovate, acute.*

8. **D. giganteus**, *Munro in Trans. Linn. Soc.* xxvi. (1868) 150; stem-sheaths very large nearly glabrous, leaves up to 20 by 4 in. oblong young hairy beneath, spikelets $\frac{1}{2}$ in. ovoid acute spinescent puberulous, empty gls. ovate mucronate striate, fl. gls. 3–6 thin mucronate many-nerved, anthers acuminate. *Kurz Ind. Forester*, i. 346 ; *Gamble Bamb. Brit. Ind.* 88, t. 76. Bambusa gigantea, *Wall. Cat. Bot. Gard. Calc.* 79 ; *Voigt Hort. Suburb. Calc.* 719.

TENASSERIM, the MALAY PENINSULA, and PENANG (cult. in Assam and elsewhere in India).

Stems 80–100 ft. by 8–10 in. diam., branched above, nodes hairy, internodes rather short, grey-green, young with waxy scurf, walls thin. *Stem-sheaths* 20 in., as broad at the base, deciduous, thinly strigose with golden hairs, top depressed ; blade 5–15 by $3\frac{1}{2}$ in., decurrent into glabrous stiff brown wavy auricles, narrowed above into a short point ; ligule 2–5 in., stiff, black, margin serrate. *Leaves* cuspidately acuminate, tips twisted, young hairy beneath, midrib strong, nerves 12–16 pairs, with pellucid cross bars. *Panicle* very large, branchlets slender curved ; heads up to 1 in. diam. $\frac{1}{2}$–1 in. apart. *Spikelets* sometimes all flowering, rachilla produced with an imperfect gl. *Ovary* ovoid and long style hairy, stigma simple. *Grain* oblong, obtuse, hairy above.

9. **D. calostachyus,** *Kurz For. Fl. Burma*, ii. 562; stem-sheaths truncate tawny-strigose, leaves 9–12 by 1–2½ in. broadly lanceolate softly hairy beneath, spikelets about ½ in. ovate acute faintly pubescent, empty gls. 2–3 broadly ovate acute many-nerved, flg. gls. 4–6 rather longer, anthers yellow mucro smooth. *Gamble Bamb. Brit. Ind.* 89, t. 77. Bambusa calostachya, *Kurz in Journ. Beng. As. Soc.* xlii. (1873) 249.

UPPER BURMA; Bhamo and Kachin Hills up to 3500 ft., *J. Anderson.*

Stems with appressed silvery hairs; nodes thickened, annulate. *Stem-sheaths* truncate; ligule narrow, subentire. *Leaves* shortly petioled, base rounded, nerves 9–13 pairs, sheaths white-ciliate, mouth truncate, callus small; ligule broad, truncate. *Panicle* of long whip-like curved spikes; rachis flattened on alternate sides, glaucous, subpuberulous; heads of 2–5 spikelets, bracts few small. *Spikelets* subcompressed; flg. gls. with conspicuous transverse nervules; palea 5-nerved and transversely nervuled between the ciliate keels and 1-nerved outside the keels. *Ovary* broadly ovoid, subhemispheric and long style hairy, stigma simple fringed.

10. **D. latiflorus,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 152, t. 6; leaves 7–10 by 1–2 in. broadly lanceolate long-acuminate, spikelets ½–¾ in. few in a head ovate-oblong compressed, gls. many-nerved pubescent, empty gls. 2 short broad acute ciliate, fl. gls. 6–8 broadly ovate suddenly narrowed to a subobtuse point, margins dark colrd. ciliate, anthers pale tipped by a hairy mucro. *Gamble Bamb. Brit. Ind.* 131, t. 117. Bambusa latiflora, *Kurz in Journ. As. Soc. Beng.* xlii. (1873) II. 250. B. verticillata, *Benth. Fl. Hongk.* (*ex Munro*).

UPPER BURMA; Southern Shan States, *King's Collector.*—DISTRIB. China, Formosa.

A very large Bamboo. *Stems* tall, fistular, internodes short, 5 in. diam., cavity large, striate, glabrous. *Leaves* shortly petioled, glabrous, midrib prominent, nerves 9 pairs, transverse nervules many obscure; sheath sulcate, glabrous or hairy between the lines, ligule truncate. *Panicle* large, uppermost spikelets followed by leaf-like bracts 1–1½ in. long, rachis softly hairy, flattened on one side, white-ringed above. *Ovary* ovoid from a broad base and long style hairy, stigmas 1–2.

** *Spikelets short, obtuse.*

11. **D. longispathus,** *Kurz For. Fl. Burma*, ii. 561; stem-sheaths persistent papery strigose with patches of brown hair, leaves oblong- to linear-lanceolate narrowed to the base rough almost white beneath, spikelets ⅕–¼ in. in small heads obtuse nearly glabrous, empty gls. 2–3 obovate obtuse, flg. gls. 2–3 obovate cucullate margins ciliate many-nerved, anthers short tip mucronate black. *Gamble Bamb. Brit. Ind.* 89, t. 78. Bambusa longispatha, *Kurz in Beng. As. Soc. Journ.* xlii. (1873) II. 249.

SILHET, *Mann.* CHITTAGONG, *Lister*, &c. ARRACAN, *Schlich.* BURMA, *Brandis*, &c.

Stems 60 ft., leafy above only, nodes often rooting; internodes 10–24 in. by 3–4 diam., grey-green, walls ½ in. thick. *Stem-sheaths* fragile, 15–20 by 5–7 in., sides parallel till near the depressed sometimes 1-auricled top; blade 12–18 in., lanceolate, dorsally hairy; ligule broad, serrate and often fimbriate. *Leaves* acuminate midrib thick yellow, nerves 8–10 pairs; sheath smooth, glabrous; ligule narrow. *Panicle* large, sometimes leafy, of interruptedly spicate clusters ⅕–⅔ in. broad, with hard polished bracts at the base. *Spikelets* few or many-fld. *Ovary* broadly ovoid, subacute; style rather short, stigma short. *Grain* ovoid, yellow, beaked.

12. **D. Brandisii,** *Kurz For. Fl. Burma*, ii. 560; stem-sheaths thickly coriaceous white-pubescent, leaves 9–12 by 1–2 in. oblong-lanceolate softly

hairy beneath, spikelets $\frac{1}{5}$–$\frac{1}{3}$ in. depressed ovate puberulous, empty gls. 1–2 broadly ovate mucronate, flg. gls. 2–4 similar few-nerved margins ciliate hairy below the tip, anthers short apiculate or penicillate greenish-yellow. *Gamble Bamb. Brit. Ind.* 90, t. 79. Bambusa Brandisii, *Munro in Trans. Linn. Soc.* xxvi. (1868) 209.

BURMA; Pegu, Martaban Hills, and Ruby-mines district, *Kurz*, &c.

Stems 60–100 ft. by 5–8 in. diam., tufted; nodes slightly swollen, internodes ashy-grey, 12–15 in., walls thick. *Stem-sheaths* up to 2 ft. by 12–14 in., top depressed; blade 6–18 in., linear-lanceolate, strigose within, decurrent in small plaited auricles; ligule $\frac{1}{2}$–$\frac{3}{4}$ in., lacerate. *Leaves* base narrowed, petiole wrinkled, midrib stout shining, nerves 10–12 with transverse pellucid glands; young sheaths pubescent, mouth with a few long cilia, callus large, glabrous. *Panicle* large, branches whip-like, rachis densely pubescent flattened on one side, internodes 1–1$\frac{1}{2}$ in.; heads $\frac{1}{2}$–$\frac{3}{4}$ in. diam., bracteate; palea with 3-nerved side wings. *Lodicules* 1, 2, or 0, 3-nerved, long-ciliate. *Filaments* short. *Ovary* ellipsoid, hairy, style short, stigmas 2 plumose. *Grain* ovoid, mucronate, hairy above.—Perhaps not different specifically from *D. flagellifer*.

13. **D. flagellifer,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 150; very near *D. Brandisii*, but leaf-base more rounded, rachis of spikes more hairy, heads with fewer spikelets. *Gamble Bamb. Brit. Ind.* 91, t. 80. Bambusa flagellifera, *Griff. mss.* ? B. Bitung, *Schult. Syst.* vii. II. 1354.

TENASSERIM; on Moolyet, alt. 2000 ft., *Beddome*. SINGAPORE, *Ridley*.

A little known species, probably only *D. Brandisii*.

14. **D. longifimbriatus,** *Gamble Bamb. Brit. Ind.* 92, t. 81; leaves 12–14 by 2–3 in. oblong acuminate, auricles of sheath long falcate stiffly ciliate with curved bristles, spikelets very small glabrous, empty gls. broadly ovate striate, flg. gls. 1–2 ovate acute keeled often mucronate, anthers short apiculate.

BURMA; in the extreme south of the Mergui district (*Herb. Calcutt.*).

Leaves very large, base rounded unequal, petiole $\frac{1}{2}$ in. wrinkled, pale and smooth beneath, midrib hairy beneath, nerves 12–18 pairs, transverse nervules of pellucid glands; sheath shining, callus narrow; ligule short, very hairy. *Panicle* large, branchlets solid, short; rachis slender, flexuous, glabrous; heads (young only seen) bracteate. *Ovary* ovoid, glabrous, style hairy, stigma plumose.—An imperfectly known species, best distinguished by the falcate long-fringed auricles of the leaves.

IMPERFECTLY KNOWN SPECIES.

15. **D. Parishii,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 149; panicle of globose interrupted dense heads, spikelets about $\frac{1}{3}$ in. ovoid subobtuse nearly glabrous compressed, empty gls. 1–2 ovate acute many-nerved ciliate, flg. gls. 2–3 similar glabrous, upper mucronate tessellately nerved ciliate, anther tip obtusely acute. *Brandis For. Fl.* 570; *Gamble Bamb. Brit. Ind.* 93, t. 82.

The PANJAB HIMALAYA, *Parish*.

Flowers nearest *D. Hookeri* (of which it is possibly a planted specimen), differing in the glabrous gls. and obtusely acute anthers.

16. **D. Collettianus,** *Gamble Bamb. Brit. Ind.* 93, t. 83; heads of spikelets $\frac{1}{2}$–1 in. diam. bracteate with 6–12 fertile and a few sterile fls. rachis pubescent, spikelets $\frac{1}{2}$–$\frac{3}{4}$ in. soft white-pubescent, empty gls. 2 ovate acute many-nerved midrib thickened, flg. gls. 2–4 and an imperfect ovate-

lanceolate shortly mucronate pubescent many-nerved, palea larger than the flg. gl., keels long-ciliate with white hairs, anthers obtusely apiculate.

UPPER BURMA; Fort Stedman, *Abdul Huk.*
The softly white-hairy spikelets are diagnostic.

139. **MELOCALAMUS**, *Benth.*

Stem semiscandent from a stout rootstock. *Stem-sheaths* hard, cylindric, auricled. *Leaves* large, petioled, transverse nervules 0. *Panicle* large. *Spikelets* in dense heads, very small, rachilla continuous and produced beyond the upper gl.; empty gls. 2, broad, obtuse, many-nerved; flg. gls. 2, bisexual but one only fertile; palea very broad, cymbiform, membranous. *Lodicules* 3, large, ciliate. *Stamens* 6, filaments short, free, anthers obtuse. *Ovary* glabrous, style short, stigmas 2–3 plumose. *Grain* very large, depressed-globose, pericarp tough; seed large, fleshy.

M. compactiflorus, *Benth. in Journ. Linn. Soc.* xix. (1881) 134; *Gamble Bamb. Brit. Ind.* 94, t. 84. Pseudostachyum compactiflorum, *Kurz For. Fl. Burm.* ii. 567; *Ind. Forester,* i. t. II. fig. 13.

EASTERN BENGAL and BURMA; from Silhet to Arracan, Martaban, and the Ruby Mines district.

Stems 15–100 ft. by $\frac{1}{2}$–1 in. diam., rough, spreading and arching over tall trees, nodes thickened; internodes grey green, 14–24 in. *Stem-sheaths* about 6 by 3 in., smooth or strigose, mouth dilated; blade long-acuminate, dilating into a narrow dark reflexed crescentic auricle fringed with stiff bristles, hispid towards the base; ligule narrow, entire. *Leaves* 6–10 by 1–2 in., oblong-lanceolate, tip subulate penicillate twisted, base rounded, petiole hairy, midrib narrow, nerves 8–12 pairs; sheath striate, young strigose, mouth truncate, auricle lunate reflexed; ligule narrow. *Panicle* interrupted, often leafy, heads $\frac{1}{3}$–$\frac{1}{2}$ in. diam., subglobose, rachis flexuous pubescent, laterally flattened. *Spikelets* $\frac{1}{10}$ in., or rather more, obtuse or truncate, 2-cleft; empty gls. ventricose; fl. gls. similar, often ciliate. *Grain* 1–$1\frac{1}{2}$ in. diam., seated in the persistent glumes.

140. **PSEUDOSTACHYUM**, *Munro.*

Shrubby, rootstock creeping. *Stem-sheaths* short. *Leaves* large, tessellately nerved. *Panicle* with drooping spikes. *Spikelets* small, solitary in the axils of narrow bracts, 1–fld., rachilla produced with imperfect gls.; empty gl. usually solitary, broad, mucronate, about 7-nerved; flg. gl. similar; palea thin, convolute, 2-keeled. *Lodicules* 3–5, large, ciliate. *Stamens* 6, anthers apiculate. *Ovary* linear-oblong, glabrous, style long rigid, stigmas 2 hairy. *Grain* depressed-globose.

P. polymorphum, *Munro in Trans. Linn. Soc.* xxvi. (1868) 142, t. 4; *Gamble Bamb. Brit. Ind.* 96, t. 85.

SIKKIM HIMALAYA, ASSAM, the GARROW HILLS, MUNNIPORE & BURMA, *Griffith,* &c.

Stems up to 50 ft., by 7–12 in. diam., arising singly from the rootstock, often subscandent, nodes hardly swollen, internodes 7–12 in. by 1 in. diam., at first glaucous, walls very thin. *Stem-sheaths* shorter than the internodes, triangular, truncate, strigose with brown hairs, auricle very short with a tuft of stiff bristles; blade long-acuminate in young shoots, base as broad as the truncate top of the sheath; ligule short. *Leaves* 4–14 by 1–2 in., narrowed into the stout $\frac{1}{3}$–$\frac{1}{2}$ in.

petiole, midrib pale, nerves 7–11, nervules oblique; ligule short. *Panicle* large, leafy, branches fascicled, rachis wiry angled. *Grain* subtended by the gls. and lodicules, pericarp crustaceous.—Spikelets in diseased specimens converted into rounded softly hairy masses.

141. **TEINOSTACHYUM,** *Munro.*

Shrubby or arborescent; stems thin, arching. *Stem-sheaths* usually thin. *Leaves* various. *Panicle* spiciform, on leafy branches. *Spikelets* in bracteate whorls, long, narrow, many-fld., upper and lower fls. imperfect; empty gls. 1–2, mucronate; fl. gls. similar, mucros longer; palea convolute, keels ciliate. *Lodicules* 3, 3–9-nerved. *Stamens* 6, filaments free, slender. *Anthers* obtuse or obtusely apiculate. *Ovary* ovoid or depressed-globose, apex produced enclosing the style, stigmas 2–3 plumose. *Grain* ovoid, acuminate, beaked, pericarp crustaceous.—Species the following.

1. **T. Griffithii,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 143, t. 3; stem-sheaths auricled, leaves 6–10 by ¾–1½ in. oblong-lanceolate glaucous beneath, spikelets 2–3 in. linear puberulous, empty gls. 1 or 2 (the second sterile) narrowly ovate mucronate, fl. gls. 3–5 ovate acute mucronate 9–11-nerved, lodicules glabrous. *Gamble Bamb. Brit. Ind.* 98, t. 86. Cephalostachyum Griffithii, *Kurz For. Fl. Burma*, ii. 566.

The KHASIA HILLS, ASSAM, CHITTAGONG & BURMA.

Stems 25–50 by ½–¾ in. diam., slender, arching, straggling or subscandent, branches whorled, internodes 18–26 in., walls thin. *Stem-sheaths* 6 by 1½ in. or more, strigose with white hairs above; blade 3–4 in., dilated into large auricles fringed with long curved reflexed bristles, shaggy within; ligule short. *Leaves* cuspidate, base rounded, petiole wrinkled, midrib with clusters of long hairs at the base, nerves 8–10 pairs with transverse pellucid glands; sheath keeled, auricles falcate and short ligule ciliate with deciduous hairs. *Panicle* leafy, branches often whip-like with few often pedicelled spikelets or axillary fascicles, rachis smooth striate; rachilla jointed between the gls. *Palea* longer than the fl. gl., keels fringed half way down, 4-nerved on each side. *Lodicules* ovate-lanceolate, glabrous, 7-9-nerved. *Anthers* yellow. *Ovary* stipitate, glabrous, style triquetrous. *Grain* obliquely ovoid, tapering at both ends, beaked, glossy.

2. **T. Wightii,** *Beddome Fl. Sylvat.* t. cccxxiii.; *Forest. Man.* p. ccxxxiii. (*excl. Syn.*) stem-sheaths papery hirsute top truncate not auricled, leaves 6–15 by 1–2 in. oblong-lanceolate, panicle with spiciform drooping branchlets, spikelets ½–1 in., empty gl. 1 ovate mucronate 5–7-nerved dorsally hirsute, fl. gls. 1 or 2 mucronate nerved transversely, lodicules short ciliate. *Gamble Bamb. Brit. Ind.* 99, t. 87.

WESTERN GHATS, alt. 3–5000 ft., from N. Canara to Cape Comorin.

Stem 10–20 ft., by 1–1¼ in., semi-scandent, branches pendulous, nodes narrowly ringed; internodes bright green, rough above, walls thin. *Stem-sheaths* 10–12 by 1–1¼ in., hairs black-brown; blade subulate, 5–7 in., decurrent on the sheath; ligule $\frac{1}{10}$ in. *Leaves* acuminate, tip scabrous twisted, whitish and sparsely hairy beneath, midrib broad yellowish, nerves 6–7 pair, tessellate by glands; sheath glabrous; ligule narrow. *Panicle* large, spiciform branches bracteate, rachis smooth, slender. *Rachilla of spikelets* slender, flattened and concave below, thickened and ciliate above. *Lodicules* ovate, 3–5-nerved. *Ovary* stipitate, depressed-globose, smooth, style included in the long beak of the ovary. *Grain* stoutly stipitate, ovoid, beaked, glabrous.

3. **T. attenuatum,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 143;

stem- and leaf-sheaths not auricled pale strigose, leaves 3–6 by ½–1 in., panicle leafy, spikelets 1 in. clustered at the nodes of simple stiff terminal spikes, empty gl. 1 ovate mucronate 7-nerved ciliate, fl. gls. 2–3 longer 9–11-nerved and 1–2 terminal imperfect, lodicules lanceolate tip ciliate. *Beddome Fl. Sylvat. Forest. Man.* p. ccxxxiv.; *Trim. Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 100, t. 88. Bambusa attenuata, *Thwaites Enum. Pl. Zeyl.* 375.

CEYLON; Central Province, alt. 4–6000 ft., *Thwaites*, &c.

Stems 12–25 ft. by ½–1 in. diam., tufted, tips filiform, wiry, nodes with many branches. *Leaves* smooth and pale beneath, tip subulate twisted scabrous, midrib faint, nerves 3–4 pairs; sheath sparingly strigose, margins ciliate, mouth truncate, fringed with deciduous bristles; ligule short. *Panicle* leafy, usually of short spikes clustered at the nodes, clusters bracteate composed of several barren spikelets and a few longer often curved fertile, rachis smooth swollen above. *Lodicules* 3-nerved. *Filaments* long, twisted. *Ovary* ovoid, acuminate, glabrous, style long, stigmas 3. *Grain* narrowed at both ends, beaked, glabrous.

4. **T. Dullooa,** *Gamble Bamb. Brit. Ind.* 101, t. 89; stem-sheaths not auricled, leaves variable, spikelets ½–1 in. in a panicle of spiciform branches subtended by long truncate bracts softly pubescent, empty gls. 2 small truncate, flg. gls. ½ in. acuminate hairy 10-nerved, palea as long glabrous convolute not keeled, rachilla jointed produced into a long point.

BHOTAN, ASSAM, SILHET and the hills eastwd. to CHITTAGONG and UPPER BURMA.

Stems 20–30 ft. by 1–3 in. diam., tufted, sometimes scandent; nodes dark green, little prominent; internodes 16–40 in., dark green with a few whitish hairs; glossy, white beneath the nodes. *Stem-sheaths* variable, 4–12 in., strigose with white hairs, top concavely truncate loosely fringed with stiff bristles; blade 3–6 in., narrow, convolute, very hairy within, base rounded; ligule long, fimbriate. *Leaves* oblong-lanceolate, subciliately acuminate, tip twisted scabrid, base rounded, petiole ⅕–¼ in., pubescent or glabrescent beneath, midrib pale, nerves 6–10 pairs, tessellate by pellucid dots; sheath striate, margins ciliate, mouth with stiff deciduous bristles, callus ciliate or glabrous; ligule long-fimbriate. *Ovary* glabrous; style, long reddish.

5. **T. Helferi**, *Gamble Bamb. Brit. Ind.* 102, t. 90; stem-sheaths thick brittle top truncate with a narrow long-fringed band, leaves 6–18 by 1–3 in. oblong-lanceolate, panicle of long terminal whip-like densely hairy flexuous spikes bearing distant heads of few sterile spikelets which consist of 2–3 striate mucronate hairy empty gls. Bambusa Helferi, *Munro in Trans. Linn. Soc.* xxvi. (1868) 114. Pseudostachyum Helferi, *Kurz in Journ. As. Soc. Beng.* xlii. (1872) ii. 253, *For. Fl. Burm.* ii. 568.

GARROW, KHASIA and JAINTEA HILLS, alt. 3500 ft., PEGU and MARTABAN.

Stems bushy or climbing, 20–40 ft. by 1–1½ in. diam. arching to the ground and rooting, young strigose with white hairs, nodes thickened whitish; internodes 20–50 in., young white-velvety, old with a white band, walls very thin. *Stem-sheaths* 8–10 in., persistent, sparsely strigose with white bristles; blade lanceolate, glabrous or shortly hispid, decurrent on a fringed band on the top of the sheath; ligule narrow, fringed with stiff white hairs. *Leaves* very variable, unequal-sided, cuspidately acuminate, glabrous and glaucescent beneath, midrib stout, nerves 7–15 pairs, tessellate by pellucid glands; sheath glabrous, auricle long-fringed deciduous, callus smooth; ligule narrow, fringed with fragile hairs.—Very near *T. Griffithii.*

142. CEPHALOSTACHYUM, *Munro.*

Shrubby bamboos. *Stems* slender, straight. *Stem-sheaths* auricled. *Leaves* various, shortly petioled. *Spikelets* 2, in terminal globose heads, or

a panicle of bracteate heads, 1-fld., elongate, rachilla produced beyond the fl.; empty gls. 2–3, broad, chaffy, many-nerved, usually long-awned; flg. gls. more membranous, convolute, awns shorter; palea thin, many-nerved, keels 2 approximate. *Lodicules* 3, 3–5-nerved. *Stamens* 6, free, anthers long. *Ovary* stipitate, ovoid, narrowed into a long thickened style, stigmas 2–3, plumose. *Grain* oblong, beaked, pericarp separable.—Species all Indian.

* *Spikelets in a solitary head.*

1. **C. capitatum,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 139; leaves 4–8 by 1–2 in. ovate-lanceolate base unequally rounded, head 1–1½ in. diam., bracts broad long-awned glabrous, spikelets ½–⅔ in. terminating short spikes, palea obtusely mucronate tip entire, anthers obtuse. *Gamble Bamb. Brit. Ind.* 104, t. 91. Bambusa capitata, *Wall. Cat.* n. 8913.

Sikkim and Bhotan Himalaya, alt. 2–8000 ft., Khasia, Jaintea, and Naga Hills.

Stems 12–30 ft. by 1–1½ in., semi-scandent; nodes not prominent, internodes often 3 ft. or more, walls thin. *Stem-sheaths* of young stems papery, 6–12 by 2–3 in., strigose with pale brown hairs, mouth triangular, of the longer upper truncate, of the shorter lower retuse; blade long, hairy within, base rounded, decurrent into rounded sometimes fringed auricles; ligule narrow. *Leaves* pale green, whitish beneath, glabrous on both surfaces, midrib prominent, nerves 4–10 pairs, pellucid dots oblique; sheaths smooth, shining, auricle short with curved cilia. *Empty gls.* softly hairy below; lower 1–3 flg. gls. sterile; palea hairy between the keels, rachilla produced. *Lodicules* ovate-lanceolate, 3–5-nerved, shortly ciliate. *Anthers* long, tips emarginate. *Ovary* ovoid, style often twisted, stigmas 2 hairy. *Grain* depressed-ovoid, beaked, shining, pericarp crustaceous.

Var. *decompositum*, Gamble l. c. 105; spikelets in spicate almost paniculate clusters, many fertile.—Sikkim and Khasia Hills.

2. **C. pallidum,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 139; leaves 1–5 by ½–1 in. base unequally rounded, heads about 1 in., bracts broad rounded, spikelets ⅔–¾ in., palea 2-fid, anthers long-apiculate. *Kurz For. Fl. Burma*, ii. 563; *Gamble Bamb. Brit. Ind.* 105, t. 92. Bambusa andropogonifolia, *Griffith Itin. Notes*, 124, No. 417.

Khasia, Mishmi, Patkoy and Munnipore Hills, ascending to 5000 ft., *Griffith*, &c.

Shrubby or subarboreous, branches whorled. *Leaves* pale green, tip capillary, glabrous or puberulous beneath, not tessellate, midrib pale, nerves 4–6 pairs; sheath striate, margins ciliate, auricle rounded with a few deciduous cilia; ligule long. *Head* in the axil of a leaf, of many- long-awned empty gls. or sterile fl. gls. or with a few exserted fertile spikelets, all bracteate at the base; empty gls. concave, awned, many-nerved; flg. gls. similar, awn shorter than the gl.; palea many-nerved, tip and base hairy, rachilla shortly produced. *Lodicules* pubescent and ciliate. *Ovary* ovoid-lanceolate, style long conical, stigmas 2 hairy. *Grain* globosely ovoid, top conical and beaked, wrinkled.

3. **C. latifolium,** *Munro in Trans. Linn. Soc.* xxvi. (1868) 140; stem sheaths linear, oblong top narrow, leaves 10–16 by 1–4 in. ovate or ovate-lanceolate base unequal cuneate or rounded, sheaths not fringed, heads 1½–2 in. diam. of clustered sterile and 1-fld., fertile spikelets ½–1 in. long with broad awned bracteoles, tip of palea entire, anthers obtusely mucronate. *Gamble Bamb. Brit. Ind.* 106, t. 93.

Bhotan and Munnipore Hills, alt. 5–7000 ft., *Griffith*, &c.

Shrubby semi-scandent. *Stems* thin, rough, dark green, whitish below the nodes which are conspicuously ringed. *Stem-sheaths* 6–9 by 2–3 in., papery, sides

parallel, top concave with sub-acute triangular glabrous auricles; blade 4–5 by $\frac{1}{3}$–$\frac{1}{2}$ in., subulate; ligule broad. *Leaves* glabrous, base cuneate or rounded, petiole wrinkled, midrib pale prominent, nerves 8–18 pairs, pellucid dots distant; sheath striate, margins ciliate produced up to the broad ligule; callus broad, thick, emarginate. *Spikelets* glabrous, empty gls. ovate-lanceolate, glabrous, long-awned; flg. gls. acuminate, awn shorter; palea obtuse, tip hairy, nerves reticulate; rachilla shortly produced. *Lodicules* 3-nerved. *Ovary* ovoid, style long flattened, stigmas 2 short plumose. *Grain* broadly ovoid, stipitate, curved above, beaked, pericarp crustaceous.

4. **C. Fuchsianum,** *Gamble Bamb. Brit. Ind.* 107, t. 94; stem-sheaths thin top deeply concave with a bristly fringe in the sinus, leaves 8–14 by 2–4 in., ovate-lanceolate, head $2\frac{1}{2}$ in. diam., simple globose or compound elongate and lobed, spikelets $\frac{3}{4}$–1 in. glabrous sterile and fertile mixed with awned bracts, palea 2-fid anther tip apiculate or forked.

BHOTAN and the DUPHLA HILLS, alt. 6–8000 ft., *Fuchs, Lister, Gammie, &c.*

Arborescent, semi-scandent; stems small, soft, thin-walled, pale, branches whorled. *Stem-sheaths* 12 by 4 in., strigose with light brown hairs, sides nearly parallel, margins reticulately nerved, young cylindric; blade in the base of the sinus, 6–8 in., subulate, pubescent below; ligule small. *Leaves* cuspidately acuminate, base angled or rounded, midrib shining, nerves 7–10 pairs, tessellate by pellucid dots; sheath soft, margins thickly long-ciliate, auricle elongate thickly clothed with white bristles $\frac{1}{2}$–$\frac{2}{3}$ in. long; ligule moderate, ciliate. *Empty gls.* ovate, long-awned, glabrous, 17–19-nerved; flg. gl. longer, awn shorter, 21–23-nerved and cross-nervuled; palea pubescent, 2-keeled and 5–6-nerved on each side; rachilla shortly produced. *Lodicules* 3–5-nerved, ciliate. *Ovary* narrowly ellipsoid, style thick, stigmas 2 short. *Grain* as in *C. latifolium*, but tip more rounded, pericarp crustaceous.

*** Spikelets in panicled or spicate heads or fascicles.*

5. **C. pergracile,** *Munro in Trans. Linn. Soc.* xxvi. (1863) 141; stem-sheaths very short 2-auricled strigose with black deciduous hairs afterwards polished, leaves 6–14 by 1–$2\frac{1}{2}$ in. linear-lanceolate rough on both surfaces, spikelets $\frac{1}{2}$–$\frac{2}{3}$ in. diam. bracteate clusters forming filiform drooping spikes, gls. 3–4, empty gls. 0, lower 1–2 sterile, fertile solitary densely hairy with a terminal sterile, palea long 2-fid, anthers obtuse purple. *Kurz For. Fl.* ii. 564; *Gamble Bamb. Brit. Ind.* 108, t. 95.

Throughout BURMA, ASSAM, The NAGA HILLS and CHOTA NAGPORE.

Arboreous, deciduous. *Stems* 30–40 ft. by 2–3 in. diam., tufted, erect, glaucous, whitish below the scarcely thickened nodes; internodes 12–18 in., walls very thin. *Stem-sheaths* 4–6 by 6–8 in.; blade 2 in., densely hairy within, decurrent in a waved fringe bordering the top of the sheath and fringed auricles; ligule very narrow. *Leaves* thin, base rounded or cuneate, subglaucous beneath, midrib conspicuous, nerves 7–13 pairs, sparingly tessellate; sheath glabrous, mouth auricled, callus small ciliate; ligule very narrow. *Panicle* large; heads $1\frac{1}{2}$–2 in. apart, bracts small chaffy, rachis wiry. *Lodicules* narrow, tip ciliate. *Ovary* smooth, base subglobose, narrowed into a trigonous style, stigmas 2–3 stout. *Grain* $\frac{1}{4}$ in., obovate-oblong, grooved on one side, beak as long as itself.

6. **C. flavescens,** *Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 252, *For. Fl. Burm.* ii. 564; stem-sheaths short, top triangular truncate smooth or strigose with white or pale brown hairs, leaves 3–6 by $\frac{1}{2}$–$\frac{3}{4}$ in. linear, sheath with narrow auricles, spikelets $\frac{1}{2}$ in. long linear acuminate hairy, empty gls. 1–2 ovate-lanceolate mucronate hairy 7–9-nerved, fl. gl. solitary similar, palea 2-mucronate, anthers obtuse or acute yellow.

Gamble Bamb. Brit. Ind. 109, t. 96. Melocanna lutescens, *Kurz in Herb. Calcutt.*

BURMA; Pegu? (cult. in Calcutta and Madras gardens).

Evergreen, subarborescent. *Stems* 10–20 ft. by 1–1½ in. diam., smooth, dull green, at length yellow, nodes not prominent; internodes rather long. *Stem-sheaths* 4–5 by about 5 in., smooth or strigose with pale or brown hairs; blade 1–1½ in., erect, base cordate decurrent as a waved fringe with pointed long auricles edged with stiff curved bristles; ligule narrow. *Leaves* acuminate, glabrous or sparsely hairy beneath, base contracted, midrib narrow, nerves 4–6 pairs; sheath smooth, glabrous, callus very narrow, auricles long narrow; ligule narrow. *Panicle* of few whorled slender branches with clusters of spikelets 2–2½ in. apart; palea with hairy margins. *Lodicules* oblong, tip ciliate, 3–5-nerved. *Ovary* ovoid, acuminate, smooth; style trigonous, stigmas white-hairy.

7. **C. virgatum,** *Kurz For. Fl. Burma*, ii. 565; panicle leafless drooping, branchlets fascicled bearing lax distant heads of few nearly glabrous fertile and sterile spikelets, rachis smooth flattened on one side, spikelets ½ in. nearly glabrous narrow acute with 2 small sterile fls. at the base, empty gl. short ovate mucronate, flg. gl. convolute coriaceous mucronate, palea 2-mucronate, anthers obtuse. *Gamble Bamb. Brit. Ind.* 110, 132, t. 97. Melocanna virgata, *Munro in Trans. Linn. Soc.* xxvi. (1868) 133.

UPPER BURMA; on the Mogaung river, *Griffith*; Bhamo district, *Oliver*.

A medium-sized, slender, tufted Bamboo. *Stems* erect, dark green, young white scurfy, nodes not thickened; internodes 18–24 by 4 in. diam., regular, walls thin. *Stem-sheaths* 6–8 by 7–10 in. broad at the base, pale, narrowed to a nearly straight top 5–6 in. broad, strigose with golden hairs; blade 4–5 in., usually recurved, decurrent along the top of the sheath in a narrow straight band bordered with stiff recurved bristles, glabrous above, strigose beneath; base 1–1½ in. broad cordate, tip cuspidate, margins incurved; ligule narrowed, fimbriate. *Leaves* rather variable, thin, 6–12 by 1¼–2¾ in., oblong- to linear-lanceolate, cuspidately acuminate, rough on both surfaces, tip and margins scabrous, pale beneath and slightly hairy, mid-rib pale broad, nerves 10 pairs with 5–7 intermediate, cross-nervules few; sheath smooth, striate, keeled, ending in a narrow ciliate callus, and bearing short bristly auricles; ligule very short, fimbriate. *Panicles* large, heads bracteate; bracts narrow chaffy. *Lodicules* lanceolate, acuminate, shortly ciliate, faintly 3-nerved. *Ovary* ovoid, glabrous, style thickened; stigmas 2–3, purple, plumose.

143. **DINOCHLOA**, *Büse.*

Lofty evergreen scandent Bamboos. *Stems* zigzag, usually covered with persistent sheaths; nodes with a broad leathery ring left by the sheath. *Stem-sheaths* thick, loosely clasping, base wrinkled. *Leaves* large, rather soft, transverse nervules of pellucid glands. *Panicle* large, compound, of slender spicate clusters of spikelets. *Spikelets* very many, minute, in subglobose sessile heads on short branchlets, 1-fld.; rachilla inarticulate, not produced; empty gls. 1–4 broad, very obtuse, upper gradually larger; fl. gl. similar; palea convolute, not keeled, as long or longer than the gl. *Lodicules* 0. *Stamens* 6, free short. *Ovary* ovoid, glabrous, style short. *Grain* ovoid, acuminate.—Species, the following.

1. **D. Tjankorreh**, *Büse in Miq. Pl. Jungh.* 388; stem-sheaths narrowed to the mouth, leaves 6–10 by 1–1½ in. *Miq. Fl. Ind. Bat.* iii. 415; *Munro in Trans. Linn. Soc.* xxvi. 153, t. 5; *Kurz Ind. Forester*, 352; *Gamble Bamb. Brit. Ind.* 112. Bambusa scandens, *Blume ex Nees in*

Flora, vii. (1824) 291. Nastus Tjangkorreh, *Schultes Syst. Veg.* vii. 1358; *Kunth Enum. Pl.* i. 430; *Steud. Syn. Gram.* 333. Chusquea amplopaniculata, *Steud. l.c.* 337; *Miq. l.c.* 415.

MALAY PENINSULA; Perak, *Ridley.*—DISTRIB. Malay and Molucca Islds.

Stems 100 ft. by 1 in. diam. or more, green, glossy, nodes swollen, of the branches often thorny; internodes 9–18 in., hairy above, walls thin. *Stem-sheaths* loose, leathery, cylindric, narrowed to the non-auricled mouth, sparsely bristly; blade ovate-lanceolate, minutely hispid above; ligule rather broad. *Leaves* lanceolate, rather soft, base narrowed, petiole very hairy, smooth on both surfaces, mid-rib conspicuous, nerves 7–9 pairs; sheaths strigose at length glabrous, mouth rounded with long white bristles; ligule rather broad, long-ciliate. *Panicle* compound, branches thin, wiry; rachis curved, striate, flattened on one side; nodes with a ring formed by the base of the fallen bracts; clusters with few fertile and many empty gls. *Spikelets* $\frac{1}{10}$ in. or less, ovoid, glossy, brown, glabrous; empty gls. with 1–2 smaller at the base, convolute, 5–7-nerved; flg. gl. similar. *Stamens* included, anthers acute. *Stigma* 2-fid, not plumose. *Grain* $\frac{1}{10}$–$\frac{1}{5}$ in., fleshy.

Var. *andamanica*, Gamble l. c. t. 98; spikelets straw-colrd., leaves up to 12 by 2 in. softly ovate-lanceolate, mouth of sheaths more ciliate, ligule more fimbriate. D. andamanica *Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 253, *For. Fl. Burm.* ii. 570.—Andaman and Nicobar Islds., *Sieber, Kurz, &c.*

2. **D. M'Clellandi,** *Kurz in Journ. As. Soc. Beng.* xlii. (1873) ii. 253, *For. Flor. Burm.* ii. 371 (Maclellandi); stem-sheaths truncate at the mouth, leaves 6–18 by 1–4 in. *Gamble Bamb. Brit. Ind.* 113, t. 99. Bambusa M'Clellandi, *Munro in Trans. Linn. Soc.* (1868) 114.

CHITTAGONG, PEGU and MARTABAN, *Kurz, &c.*

Stem climbing, 100 ft., or short and straggling, 1-2 in. diam., grey green, nodes swollen; internodes 6–8 in., young often angled, strigose with brown pungent hairs. *Stem-sheaths* 6–9 in. by 7–9 in. at the base and 2–3 at the top, cylindric, leathery, strigose with golden-brown hairs ending in a narrow dark glabrous margin and top; blade lanceolate, glabrous without, densely hairy within, base rounded decurrent on the sheath; ligule entire or subserrate. *Leaves* broadly oblong-lanceolate, base unequally rounded, narrowed into a broad thick petiole $\frac{1}{2}$ in. long or less, glabrous on both surfaces, one or both margins retrorsely scabrid, mid-rib prominent, nerves 10–18 pairs; sheath transversely nerved, keeled, at first strigose, mouth produced into a rounded naked auricle; ligule entire or serrate.

144. SCHIZOSTACHYUM, *Nees.*

Erect or climbing, arborescent or shrubby Bamboos; stems usually slender, smooth, walls thin. *Stem-sheaths* short, cylindric, auricles small. *Leaves* broad, petioled. *Panicle* terminal, of spicate branches bearing heads of spikelets, often reduced to a spike of heads, rachis slender. *Spikelets* slender, fascicled, peduncled or 2–3-nate; empty gls. 1–3, narrow, usually mucronate, rachilla elongate between them and much beyond with a rudimentary gl.; fl. gls. 1–2, articulate below, convolute; palea like its gl., convolute, not keeled. *Lodicules* 0–4, narrow. *Stamens* 6, exserted, anthers narrow, filaments free. *Ovary* narrow, pericarp produced as a tubular beak enclosing the style, stigmas 3 short plumose. *Grain* ovoid, beaked, beak inclined, pericarp crustaceous; seed rounded.—Species 16, trop. Asia and Pacific.

* *Heads of spikelets in terminal simple spikes.*

1. **S. tenue,** *Gamble Bamb. Brit. Ind.* 114, t. 100; leaves 4–6 by

$\frac{1}{3}$–$\frac{1}{2}$ in. linear-lanceolate, heads 1–3 in a spike bracteate, spikelets few about $\frac{1}{2}$ in. long, empty gls. 1–2 ovate acute 5–7-nerved, flg. gl., longer. ? S. elegantissimum, *Kurz Ind. Forester*, i. 348. (Bambusa elegantissima, *Hassk. Pl. Jav. Rar.* 42. Beesha elegantissima, *Kurz ex Munro in Trans. Linn. Soc.* xxvi. (1808) 146).

MALAY PENINSULA; Pahang, Malacca and Johore, *Ridley*.

Stems graceful, slender, scandent. *Leaves* narrowed into a rather long petiole, smooth and glabrous on both surfaces, midrib shining, nerves 3–5 pairs, distantly tessellate by glands, sheaths smooth truncate, callus broad; ligule very narrow. *Rachis of spikes* slender, curved; bracts chaffy, mucronate, yellowish. *Spikelets* narrow, acuminate; palea longer than its gl., 2-keeled, glabrous, 2-mucronate. *Lodicules* ovate, acute, 3–5-nerved. *Stamens* exserted, anthers linear tips rounded.

2. **S. chilianthum,** *Kurz in Journ. As. Soc. Beng.* xxxix. (1870) II. 88, *Ind. Forester*, i. 348; leaves 6–10 by $\frac{3}{4}$–1 in. linear-lanceolate, heads 3–6 in a spike, spikelets about $\frac{1}{2}$ in. long, empty gls. ovate mucronate striate glabrous, flg. gl. longer. *Gamble Bamb. Brit. Ind.* 115, t. 101. Chloothamnus chilianthus, *Buese in Pl. Jungh.* 387; *Miq. Fl. Ind. Bat.* iii. 415. Melocanna gracilis, *Kurz ex Munro in Trans. Linn. Soc.* xxvi. (1868) 133.—Bambusa, *Wall. Cat.* n. 5032.

Stem 6–8 ft. by $\frac{1}{2}$–$\frac{3}{4}$ in. diam., smooth, glossy, nodes not prominent; internodes fistular, glabrous; flowering and leafing branches together half-whorled at the nodes with many bract-like sheaths; branchlets slender, curved, smooth. *Stem-sheaths* glabrous, smooth, truncate, margins ciliate; blade narrowly lanceolate, base rounded, hairy, decurrent in a long fringed band, auricles narrow long-fringed; ligule narrow long-fringed. *Leaves* long acuminate, setaceous point sometimes $1\frac{1}{2}$ in., midrib not prominent, nerves 4–6 pairs, tessellate by pellucid glands; sheath glabrous, mouth truncate bearing about 10 stiff white deciduous bristles, auricles short, callus narrow. *Heads* about $\frac{1}{2}$ in. broad, rachis slender, grooved, glabrous. *Spikelets* acuminate. *Paleæ* 2, mucronate, keeled above only. *Lodicules* 3, 3–5-nerved, ciliate. *Ovary* oblong, stigmas 3 plumose purple. *Grain* nearly $\frac{1}{2}$ in., beak inclined.

** *Heads of spikelets in panicled spikes.*

3. **S. Blumei,** *Nees Agrost. Bras.* 535; leaves 9–10 by $1\frac{1}{4}$–$1\frac{3}{4}$ in. on sterile branches up to 16 in. oblong-lanceolate, spikelets under $\frac{2}{3}$ in. cylindric, rachilla ciliate, empty gls. 2 oblong long-mucronate glabrous, flg. gl. longer, paleæ 1 or 2 inner convolute, lodicules 0, anthers obtuse. *Kunth Enum. Pl.* i. 435; *Rupr. Bamb.* 43, t. 16, 17, f. 4; *Steud. Syn. Gram.* 332; *Miq. Fl. Ind. Bat.* iii. 424; *Munro in Trans. Linn. Soc.* xxvi. (1868) 136; *Kurz Ind. Forester*, i. 350; *Gamble Bamb. Brit. Ind.* 116, t. 102. Melocanna tenuispiculata, *Kurz in Hort. Buitenz. and Calc.*

SINGAPORE, *Ridley*.—DISTRIB. Java.

Stems 30 ft., hollow, fragile, glabrous. *Stem-sheaths* cylindric, slightly narrowed to the ciliate truncate mouth, strigose with white bristles; blade leafy, erect; ligule narrow. *Leaves* acuminate, base rounded or narrowed, rough on both surfaces, pubescent beneath, midrib narrow, nerves 5–6; sheath smooth, keeled, mouth truncate and margins ciliate with white bristles; ligule short fimbriate. *Spikes* of panicle with long spreading erect or deflexed spikelets $\frac{1}{2}$–$\frac{2}{3}$ in. long and chaffy bracts, rachis very slender; empty gls. 2, striate. *Anthers* green, obtuse. *Ovary* narrowly ellipsoid.

4. **S. latifolium**, *Gamble Bamb. Brit. Ind.* 117, t. 103; leaves 9–12 by $1\frac{1}{2}$–$2\frac{1}{2}$ in. oblong acuminate, spikelets 1–$1\frac{1}{3}$ in. long acuminate, empty

gls. 2 oblong long-mucronate, flg. gls. 1 much larger ovate-lanceolate long mucronate convolute, lodicules 3–4, anthers obtuse tip penicillate.

MALAY PENINSULA; Pahang, *Ridley*.

Leaves smooth on both surfaces, base rounded, petiole ⅓ in. wrinkled, midrib prominent beneath, nerves 10–12 pairs; sheath keeled, smooth, callus broad, auricle large falcate bearing long bristles; ligule short, long-ciliate. *Panicle* 6–12 in. *Spikelets* mixed with ovate-lanceolate glabrous bracts, shortly pedicelled; empty gls. distant at the base; margins of flg. gl. often ciliate; palea lanceolate, 2-mucronate, dorsally keeled or channelled. *Lodicules* 3–4, $\frac{1}{10}$–$\frac{1}{3}$ in., 4th longer (a modified stamen?). *Anthers* long, narrow. *Ovary* narrowly lanceolate.—Near *S. longispiculatum*, Kurz Ind. Forester, i. 351, but differs in the presence of lodicules and in the penicillate anther-tips.

5. **S. aciculare,** *Gamble Bamb. Brit. Ind.* 117, t. 104; leaves 6–9 by 1½–2 in. ovate-oblong cuspidate, petiole pubescent, spikelets 1¼–1½ in. needle-like, empty gls. 2 oblong mucronate pubescent, flg. gl. linear convolute appressedly hairy long-mucronate, lodicule 1, anthers obtuse tip penicillate.

MALACCA; at Rupayoong, *Alwis*.

A small bamboo. *Leaves* almost elliptic, base rounded or narrowed, tip an obtuse scabrous hairy point, pale and smooth beneath, midrib hardly prominent, nerves 10 pairs; sheath smooth, mouth with a few long bristles, callus rounded. *Spikes* slender, rachis flattened on one side; bracts few, short. *Spikelets* very long, narrow, on short bracteate peduncles; empty gls. 2, pubescent, oblong, mucronate; palea as long as the flg. gl., mucronate, glabrous; rachilla short, grooved, glabrous. *Lodicule* 1, narrowly lanceolate, glabrous. *Anthers* very long, narrow. *Ovary* narrowly ovoid, glabrous.

145. MELOCANNA, *Trin.*

Arborescent unarmed Bamboos. *Stems* solitary on the branches of a rhizome, distant. *Stem-sheaths* short, brittle, shortly auricled, blade very long. *Leaves* broad, petioled, smooth. *Panicle* large, compound, of spicate one-sided spikelets. *Spikelets* 2–3, fascicled in bracts in the axils of the spikes, acuminate with 1 fertile and 1 or more sterile fls.; empty gls. indefinite, acuminate, mucronate, striate; fl. gl. similar; palea like its gl. convolute not keeled. *Lodicules* 2, narrow. *Stamens* 5–7, free or irregularly connate. *Ovary* glabrous, style elongate, stigmas 2–4 shortly hairy. *Fruit* very large, pyriform, long-beaked, pericarp very thick.—Species 1 or 2.

1. **M. bambusoides,** *Trin. in Spreng. Neue Enterdeck.* ii. 43, *Syst.* ii. 113 (*excl. Syn. Lour.*); stem-sheaths 5–6 in. strigose with whitish hairs abruptly truncate with rounded auricles, leaves 6–14 by 1–3 in. lanceolate or oblong-lanceolate, spikelets about ½ in. spinous glabrous, empty gls. 2–4 lanceolate, flg. gl. similar but thinner. *Rupr. Bamb.* 65; *Steud. Syn. Gram.* 331; *Miq. Fl. Ind. Bat.* iii. 423; *Munro in Trans. Linn. Soc.* xxvi. (1868) 132; *Kurz For. Fl. Burm.* ii. 569; *Gamble Bamb. Brit. Ind.* 119, t. 105. Bambusa baccifera, *Roxb. Corom. Pl.* iii. 38, t. 243, *Fl. Ind.* ii. 197. Beesha Rheedii, *Kunth in Journ. de Phys.* xlv. (1822) 4; *Revis. Gram.* i. 141; *Enum. Pl.* i. 434 (*excl. Syn.*). B. baccifera, *Schult. Syst.* vii. II. 1336. Nastus baccifera, *Roxb. ex Rasp. in Ann. Sc. Nat. Ser.* I. v. (1825) 442.

ASSAM, the KHASIA and GARROW HILLS, CHITTAGONG, ARRACAN, and TENASSERIM.

Evergreen. *Stems* solitary on branches of the rhizome, 50–70 ft. by 1½–3 in. diam., green, straight, unbranched till near the top, nodes a thin ring; internodes

12–20 in., walls thin. *Stem-sheaths* 5–6 in. by 6–12 at the base, yellow, margins straight for ⅔ up, then waved, auricles often long-fringed; blade up to 1 ft., base 1 in. broad, decurrent in a narrow strip along the top of the sheath; ligule very narrow, serrate. *Leaves* from fascicled branches, tip long twisted scabrous, glaucescent beneath, young hairy, margins ciliate, inner and 2–3 adjoining nerves scabrous, midrib prominent, nerves 8–12 pairs, tessellate by pellucid glands; sheath glabrous, auricles pointed, ciliate and bearing 10–12 large whitish bristles; ligule very short. *Panicle* with drooping branches. *Spikelets* about ½ in., glabrous; empty gls. with sometimes abortive buds. *Lodicules* erose, 3–5-nerved. *Fruit* up to 3–5 by 2–3 in.

2. **M. humilis,** *Kurz For. Fl. Burm.* ii. 569; stem-sheaths very short glabrous? mouth much produced rounded inflated and sinuate, leaves 4–6 by ⅔–1 in. lanceolate to linear-lanceolate roughish puberulous beneath, base obtuse, petiole about ⅕ in., sheath glabrous mouth minutely auricled deciduously long-fringed. *Gamble Bamb. Brit. Ind.* 120, t. 106.

ARRACAN and PEGU, *Kurz.*

Known chiefly from the leaves and sheath. *Stems* 8–15 by 1 in. diam.; nodes hardly thickened, internodes about 1 ft. *Blade of stem-sheath* linear, erect, decurrent in a narrow nude green strip bordering the sinuses; ligule very narrow, entire.

146. **OCHLANDRA,** *Thwaites.*

Shrubby, gregarious, reed-like Bamboos. *Stems* erect, internodes rather long, thin-walled. *Stem-sheaths* thin, persistent, auricles small. *Leaves* as in *Bambusa*, margins cartilaginous, nerves many; sheath striate, fringed; ligule (except in one sp.) short. *Spikelets* fertile and sterile mixed, or whorled on terminal spikes or spicate panicles from a leafy branchlet, often very large, 1-fld.; empty gls. 2–5, usually mucronate; flg. gl. like the uppermost empty, mucronate; palea membranous, not or faintly 2-keeled. *Lodicules* 1 or more, usually appressed to the filaments. *Stamens* 6–120, filaments free or monadelphous, exserted; anthers long, narrow. *Ovary* narrow, style elongated, stigmas 3–6. *Fruit* large, ovoid, long-beaked, pericarp fleshy.—Species the following.

* *Stamens many, ligules short, filaments free.*

1. **O. Rheedii,** *Benth. ex Gamble Bamb. Brit. Ind.* 121, t. 107; leaves 4–10 by ½–1¼ in. linear-lanceolate, sheath smooth, auricles falcate fringed with bristles, spikelets cylindric acute glabrous, sterile ½–⅔ in., fertile 1–1¼ in., empty gls. 2–3 broadly ovate mucronate many-nerved, flg. gl. larger subacute, anthers mucronate. Beesha Rheedii, *Kunth Enum. Pl.* i. 434 (*excl. all cit. but Rheede*); *Rupr. Bamb.* 65; *Munro in Trans. Linn. Soc.* xxvi. (1868) 144; *Beddome Fl. Sylvat. Forest. Man.* p. ccxxxiv. Melocanna Rheedii, *Steud. Syn. Gram.* 332. Bambusa scriptoria, *Dennst. Schluess. Hort. Malab.* 31.—*Rheede Hort. Mal.* v. t. 60.

COCHIN and TRAVANCORE, *White, Johnstone, &c.*

Stems erect, up to 16 ft. by 1 in. diam.; nodes somewhat raised; internodes about 17 in., walls ⅕ in. thick. *Stem-sheaths* 4–6 in., purplish-green, young hairy, margins ciliate, top rounded-truncate, auricles falcate long-ciliate; blade subulate, base hairy within; ligule short, ciliate. *Leaves* usually small, base rounded, smooth on both surfaces, midrib narrow, nerves 5–10 pairs. *Spikes* or spicate *panicles* terminal or axillary on leafy branchlets. *Palea* convolute, long-mucronate, base membranous. *Lodicules* many, ⅓–½ in., acute, glabrous, 1–7-nerved. *Stamens* 15–18. *Ovary* oblong, style embraced by the enlarged perigynium, stigmas 3, plumose. *Fruit* oblong, long-beaked.

Var. *sivagiriana*, Gamble l. c. 122, t. 108; spikelets rather larger, stamens up to 60, leaves generally larger.—Pulney and Sivagiri Hills, *Beddome.*

2. **O. stridula,** *Thw. Enum. Pl. Zeyl.* 376; leaves 8–12 by 1½–2½ in. oblong-lanceolate, young sheath hirsute, auricles falcate fringed with bristles, spikelets 1 in. cylindro-conical sparsely hairy, empty gls. 2–3 convolute mucronate ciliate, flg. gl. larger, anther tips 2-fid and mucronate. *Trimen Cat. Ceyl. Pl.* 110; *Gamble Bamb. Brit. Ind.* 123, t. 109. Beesha stridula, *Munro in Trans. Linn. Soc.* xxvi. (1868) 145; *Beddome Fl. Sylvat. Forest. Man.* p. ccxxxiv. Bambusa stridula, *Moon Cat. Ceyl. Pl.* 26.

CEYLON; in the southern parts of the Island, *Thwaites.*

Stems 6–18 ft. by ½–⅔ in. diam., tufted, light green, geniculate, nodes ringed; internodes 12–14 in., scabrous. *Stem-sheaths* persistent, cylindric, glabrous, young purple, tip rounded with falcate small fringed auricles; blade subulate. *Leaves* broad, somewhat rough beneath, base rounded, petiole broad, midrib slender, nerves 10–12 pairs, tessellate by pellucid glands. *Spikelets* in a terminal panicle, whorled, few fertile, rachis of spike long, rough, glaucous. *Lodicules* 6–12 or more, lanceolate, 1– many-nerved, convolute. *Stamens* up to 30, filaments free, flat. *Ovary* narrow, beak trigonous; stigmas 4–5, plumose, at first twisted. *Fruit* 1 in., ovoid, beak 1 in.

Var. *maculata*, Gamble l. c. 124; stem greyish-green mottled with dark purplish blotches. Teinostachyum? maculatum, *Trim. in Journ. Bot.* xxiii. (1885) 273, *Cat. Ceyl. Pl.* 110.—Ceylon, *Ferguson.*

3. **O. Beddomei,** *Gamble Bamb. Brit. Ind.* 124, t. 110; leaves 6–8 by 1–1½ in. oblong-lanceolate margins revolute, auricles decurrent fringed with bristles, spikelets 1–1½ in. hirsute, empty gls. 2 ovate long-mucronate many-nerved, flg. gl. 1⅓ in. ovate-lanceolate mucronate many-nerved glabrous, anther tips 2-fid and mucronate.

NILGHIRI HILLS; in the Wynaad district, *Beddome.*

Leaves long-acuminate, base unequally rounded, subglaucous beneath, midrib slender, nerves about 8 pairs; sheaths puberulous, margins ciliate, callus narrow. *Panicle* short, spicate, terminating a leafy branchlet; rachis stiff, puberulous. *Spikelets* few together, cylindric-conical, 2-3-bracteate, hairs tuberous-based, brown, spreading; palea 1 in., membranous, acute or obtuse. *Lodicules* 5, all different, 3–7-nerved, entire or 2-fid. *Stamens* about 32. *Ovary* subglobose, beak embracing the style, stigmas 5–6 plumose.

** *Stamens many, ligule short, filaments coherent.*

4. **O. travancorica,** *Benth. ex Gamble Bamb. Brit. Ind.* 125, t. 111; leaves 6–18 by 2–4½ in. broadly oblong-lanceolate, auricles short falcate spikelets 2–2½ in. ovoid or ovoid-oblong, glabrous, empty gls. usually 3, lowest truncate tip subulate upper 2 in. long-acuminate, flg. gl. like the upper empty, anther-tips penicillate. *Gamble Bamb. Brit. Ind.* 125, t. 111. Beesha travancorica, *Beddome Fl. Sylvat.* t. cccxxiv. *Forest. Man.* p. ccxxxiv.

TRAVANCORE and TINNEVELLY, alt. 2–5000 ft., *Beddome*, &c. (monopolizing miles of country).

An erect gregarious reed-like bamboo. *Stems* 6–20 ft. by 1–2 in. diam., nodes swollen and scarred; internodes 1½–5 ft., rough; walls very thin. *Stem-sheaths* 6–8 in., thin, vertically wrinkled, young strigose with tuberous-based hairs, tip truncately rounded, fringed with bristles; blade subulate. *Leaves* glabrous or scaberulous, base rounded, petiole broad, midrib thick below, nerves 12–17 pairs, tessellate by pellucid glands; sheath glabrous, keeled, margins ciliate, callus shining; ligule short, truncate. *Spikelets* a few fertile and a few much smaller sterile together in the axils of ovate-lanceolate smooth bracts with subulate deciduous tips; single

spikelets with 2–4 small sheathing bracts; gls. all many-nerved; palea acute, faintly 2-keeled. *Lodicules* 3, ½ in., membranous, 3-7-nerved. *Stamens* up to 120, filaments coherent. *Ovary* narrow, tip 4-angled, stigmas 5–6 plumose spirally twisted together. *Fruit* 2 in. by ½ in. diam., ovoid-oblong, beak 2 in., pericarp fleshy.

Var. *hirsuta*, Gamble l. c. 126, t. 112; spikelets densely brown velvety, leaves thicker, margins more cartilaginous, leaf-sheaths with appressed tuberous-based hairs. —Travancore Hills, *Beddome.*

**** Stamens many, ligule* 1 *in. or more, filaments free.*

5. **O. Brandisii,** *Gamble Bamb. Brit. Ind.* 126, t. 113; leaves 10–20 by 1½–3 in. oblong-lanceolate acuminate, auricles short fringed, spikelets 1–1½ in. conical glabrous bracteolate with chaffy scales, gls. all many-nerved, 3–4 lower empty thick ovate truncate tip subulate, upper thinner, flg. gl. membranous, anthers long-apiculate. Bambusa Wightii, *Munro in Trans. Linn. Soc.* xxvi. (1868) 111.—*Wight Cat.* n. 1009.

Tinnevelly Ghats; at Courtallam, *Wight, Brandis.*

Leaves thick, base narrowed, glabrous on both surfaces, whitish beneath, petiole short broad wrinkled beneath, midrib stout, nerves 10–13 pairs strong, tessellate by pellucid glands; sheath striate, callus smooth rounded. *Spike* terminal, rachis thick, whorls of spikelets several in the axils of ovate glabrous bracts; palea like the flg. gl. but smaller. *Lodicule* solitary, ½–$\frac{6}{10}$ in.; many-nerved, truncate and retuse. *Stamens* up to 60. *Ovary* glabrous, stigmas 5, plumose.

***** Stamens* 6 *or fewer, unequal, filaments free or coherent, ligule short.*

6. **O. Ridleyi,** *Gamble Bamb. Brit. Ind.* 127, t. 114; leaves 9–10 by 1–1½ in. oblong-lanceolate cuspidately acuminate, auricles rounded or falcate long-ciliate, spikelets about 1 in. appressedly hairy, empty gls. 1–2 ovate truncate long mucronate, flg. gls. 1–2 longer, rachilla produced beyond the upper, paleæ 2 not keeled.

Singapore, *Ridley & Feilding.*

Leaves smooth above except the marginal nerves, scaberulous beneath, base rounded, petiole short broad, midrib slender, nerves 10–12 pairs; sheath short, smooth, striate, callus narrow. *Spike* or spicate *panicle* 3–4 in., terminating a leafy branchlet; heads subdistichous, bracteate; bracts with imperfect blades, ovate, truncate, fimbriate. *Spikelets* several sterile, few fertile; outer palea narrow, convolute, bimucronate, tip hairy, inner shorter tip rounded glabrous. *Lodicules* 6–10, many-nerved, entire or forked. *Stamens* 6, 3 longer obtuse, 3 shorter acute. *Ovary* linear; style long embraced by the enlarged perigynium, stigma plumose.

Flowers unknown.

7. **O. setigera,** *Gamble Bamb. Brit. Ind.* 128, t. 115; stem-sheaths papery sparsely strigose narrowed to a truncate top, blade subulate hair-like, leaves 6–9 by ¾–1¼ in. oblanceolate acuminate puberulous beneath, sheath smooth, auricles decurrent, ligule very narrow erose.

Nilghiri Hills; ravines above Gudalur, alt. about 3000 ft., *Gamble.*

A small tufted erect or straggling reed-like Bamboo. *Stem* 20 ft. by ½–⅔ in. diam., naked below, nodes hardly swollen; internodes 10–12 in., very smooth, walls $\frac{1}{10}$–$\frac{1}{5}$ in. thick. *Stem-sheaths* 6–7 in., persistent tessellately wrinkled towards the top, blade ⅔–1 in., hairy within, margins incurved, top very narrow; blade ¾–1 in., hairy within, margin incurved. *Leaves* smooth above, puberulous beneath, tip capillary, midrib narrow, nerves 6–7 pairs, tessellate by pellucid glands; auricles of sheath fringed with long curved bristles.

ADDITIONS AND CORRECTIONS TO VOL. VII.

p. 4. After 41. ARTHRAXON, insert:
Spikes solitary, rachis flattened, spikelets of each pair both 2-fld. and bisexual . . . 41[1]. ISCHNOCHLOA.

p. 5. After 52. GERMAINIA, insert:
Spike solitary, joints clavate hollow, spikelets secund 2-nate lower 1-fld., upper neuter . 52[1]. COELARTHRON.

,, After 55. ISEILEMA, insert:
Spikelets as in *Anthistiria* but lower in spike not whorled and neuter . . . . . 55[1]. PSEUDANTHISTIRIA.

,, For Subtribe VI. read Tribe VI.

,, 66. PHIPPSIA, see *Catabrosa himalaica*, p. 311.

p. 6. After 67. CYATHOPUS, insert:
Spikelets compressed, fls. diandrous, gls. 1-nerved, III 2-lobed awned in the sinus . . . 67[1]. WOODROVIA.

,, Subtribes *Aireæ* and *Euaveneæ* are distinguished from one another by the very inconstant characters of the rachilla, which in *Aira caryophyllea* is produced with a minute seta beyond the fl. gl.

,, After 83. DANTHONIA, insert:
Spikelets of *Danthonia*, but lodicules 0, style single very long . . . . . 83[1]. DUTHIEA.

p. 7. After 97. PHRAGMITIS, insert:
Rachilla elongate bearded, lateral nerves only of flg. gls. with long silky hairs . . . 97[1]. NEYRAUDIA.

,, 103. CATABROSA. This genus includes 66. PHIPPSIA and 119. COLPODIUM, the position of which latter it should occupy on p. 8.

p. 8. The characters of 105. MYRIOSTACHYS and 106. HALOPYRUM are partly transposed and erroneous; read:
Infl. pyramidal dense-fld., empty gls. long-awned, grain ovoid . . . . . 105. MYRIOSTACHYS.
Infl. a lax panicle, empty gls. not awned, I 3-nerved, grain broad deeply concave ventrally 106. HALOPYRUM.

,, Dele 107. COELACHYRUM (see p. 328).

,, 119. COLPODIUM, see p. 311 under CATABROSA.

,, For DUTHIÆA read DUTHIEA, and transfer to p. 6 after 83. DANTHONIA.

p. 9. After ELYMUS, insert:
Spikelets 2- or more-fld., empty gls. 0 or minute 131[1]. ASPERELLA.

,, 135. For THYRSACANTHUS, read THYRSOSTACHYS.

p. 99. In character of *Zoysia*, line 5, dele "nerveless"; line 6, the palea is not always nerveless.

p. 100. Under COIX LACHRYMA-JOBI, var. *stenocarpa*, after Stapf. insert: "*in Hook. Ic. Pl. t.* 1764, *in Kew Bulletin* (1888) 144."

,, Under var. *Ma-yuen*, insert as synonym, C. gigantea, *Kew Bulletin* (1893) 76.

p. 167. Under habitats for *A. fastigiatus*, for Berar, read Behar.

p. 186. For Subgen. VI., read Subgen. VII.

p. 187. „ VII., „ VIII.

p. 203, line 8 from bottom, for criophorus, read eriophorus.

p. 272. In generic character of *Aira*, the rachilla is described as not produced beyond gl. IV, but it is so in *A. caryophyllea* as a very minute setiform process.

p. 282. For 84. DUTHIÆA, read 83[1]. DUTHIEA.

p. 311, line 8 from top, for $\frac{1}{3}$, read $\frac{1}{30}$.

„ „ 14 „ for *augusta*, read *angusta*.

p. 312, line 9 from top, for Graphaphorum, read Graphephorum.

„ „ 13, dele sheaths of innovations . . . to mouth.

„ Under 6. *C. Wallichii*, for $\frac{1}{10}$, read $\frac{1}{7}$.

p. 357, line 6, Festuca filiformis, *Nees*, is correctly referred to Tripogon abyssinicus at p. 287.

GENERAL INDEX.

GENERAL INDEX.*

Orders, suborders, tribes and sections in capital type; genera and species in roman type; synonyms and species incidentally mentioned in italic type.

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